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The Effect of Secondary Buyouts on Private Equity Fund Performance

Master's thesis

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Supervisor and instructor: Professor Markku Maula

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The investments and exits of private equity funds consist increasingly of secondary buyouts but the previous research on deal performance has questioned the economic rationale of secondary buyouts. The main motives for secondary buyout investments and exits are mainly found to be pressure to invest capital to boost reputation, opportunity to exploit attractive market conditions and to quickly exit investments under time pressure. Despite the criticism, a prior fund-level study has shown that funds with higher secondary buyout share of investments have superior performance.

In this study, the effect of secondary buyouts on fund performance is studied by analyzing how the secondary buyout share of investments and exits affect the net internal rate of return of buyout funds. In addition, the moderating effects of fund size, timing of transactions and credit spread are analyzed to shed light on the motives of secondary buyouts. The hypotheses were made based on existing literature on secondary buyouts and private equity fund performance and further tested using linear regression analysis. The sample used in this thesis is collected from Preqin and consists of fund performance, deal and exit data for funds with vintages 2003-2010 with performance and transaction data until the end of year 2016.

The main results show that a higher SBO share of investments leads to better fund performance. Fund size moderates this effect so that smaller funds benefit more from a high SBO share of investments whereas largest funds have better performance the lower the share is. The effect of SBO share of exits is concave and credit spread has a convex moderating effect on fund performance. The results imply that especially smaller funds should consider secondary buyouts as a good alternative and funds need to pay attention to the macroeconomic conditions when exiting their portfolio companies.

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Pääomarahastojen tekemät sijoitukset ja irtautumiset koostuvat yhä enemmän pääomasijoittajien välisistä yrityskaupoista, joita voidaan aiemman kirjallisuuden havaintojen perusteella pitää huonoina kauppoina molemmille osapuolille. Pääomasijoittajien välisten yrityskauppojen pääasiallisina motiiveina on pidetty maineen kasvattamista, mahdollisuuksia hyödyntää otollisia lainamarkkinoiden olosuhteita sekä nopeaa irtautumista sijoituksista aikapaineen alla. Kritiikistä huolimatta havaittiin aiemmassa rahastojen tuottoja tutkivassa tutkimuksessa pääomasijoittajien välisten yrityskauppojen suuremman osuuden sijoituksista vaikuttavan positiivisesti pääomarahaston tuottoon.

Tässä tutkimuksessa pääomasijoittajien välisten yrityskauppojen vaikutusta pääomarahaston tuottoihin tutkitaan analysoimalla pääomasijoittajien välisten yrityskauppojen osuutta kaikista rahaston sijoituksista ja irtautumisista sekä näiden vaikutusta rahaston tuottoon. Lisäksi tutkitaan rahaston koon, sijoitusten ja irtautumisten ajankohdan sekä lainamarkkinoiden moderoivaa vaikutusta, jotta pääomasijoittajien motiiveista saadaan lisäymmärrystä. Hypoteesit on luotu aiemman pääomasijoittajien välisiä yrityskauppoja ja rahastojen tuottoja tutkivan kirjallisuuden perusteella. Niitä tutkitaan hyödyntäen lineaarista regressioanalyysia käyttäen otosta, joka on koottu Preqin-tietokannan rahastojen tuotto-, sijoitus- ja irtautumisdataa käyttäen. Otos koostuu vuosina 2003-2010 perustetuista rahastoista ja sisältää seurantadataa vuoden 2016 loppuun asti.

Tutkimuksen tärkeimmät tulokset osoittavat pääomasijoittajien välisten yrityskauppojen suuremman osuuden sijoituksista vaikuttavan positiivisesti rahaston tuottoihin. Osuuden vaikutus on suurempi pienimmillä rahastoilla, kun taas suurimmilla rahastoilla suurempi osuus heikentää rahaston tuottoja. Pääomasijoittajien välisten sijoitusten osuuden irtautumisista vaikutuksen havaitaan olevan konkaavi ja lainamarkkinoiden olosuhteiden moderoiva vaikutus on konveksi. Tulosten perusteella etenkin pienempien rahastojen kannattaa harkita pääomasijoittajien välisiä yrityskauppoja varteenotettavina vaihtoehtoina. Irtautumisissa rahastojen tulee kiinnittää huomiota markkinaolosuhteisiin.

Asiasanat:	Julkaisukieli:
Pääomasijoittaminen, pääomasijoittajien väliset yrityskaupat, paineen alla tehdyt transaktiot, rahaston tuotto	Englanti

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Helsinki, October 2017

Tommi Huoponen

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1. Introduction

1.1 Background

Secondary buyouts (SBO) are leveraged buyouts (LBO) in which both the buyer and the seller are private equity (PE) firms. SBOs are often considered as worse deals for the acquiring PE firm, due to the already realized "low-hanging fruits", compared to PBOs that often offer unexploited efficiency improvement potential (Achleitner & Figge 2014, Bonini 2015, Jenkinson & Sousa 2015). However, due to stable cash flows and less riskier investments, SBOs may in some cases be a strategic choice by balancing the fund portfolio with riskier high-yield investments (Bonini 2015). Nonetheless, SBOs represent roughly a half of the total LBO volume and the growth has been significant, as in the late 1990s, SBOs represented only a share of less than ten percent (Bonini 2015). In this thesis, SBOs are studied from both the perspective of the buyer and seller in SBO transaction. SBO exits refer to the selling firm's exit of an investment via SBO instead of an initial public offering (IPO) or a trade sale (TS) whereas SBO investments refer to the buyer's acquisition of a company previously owned by another financial sponsor.

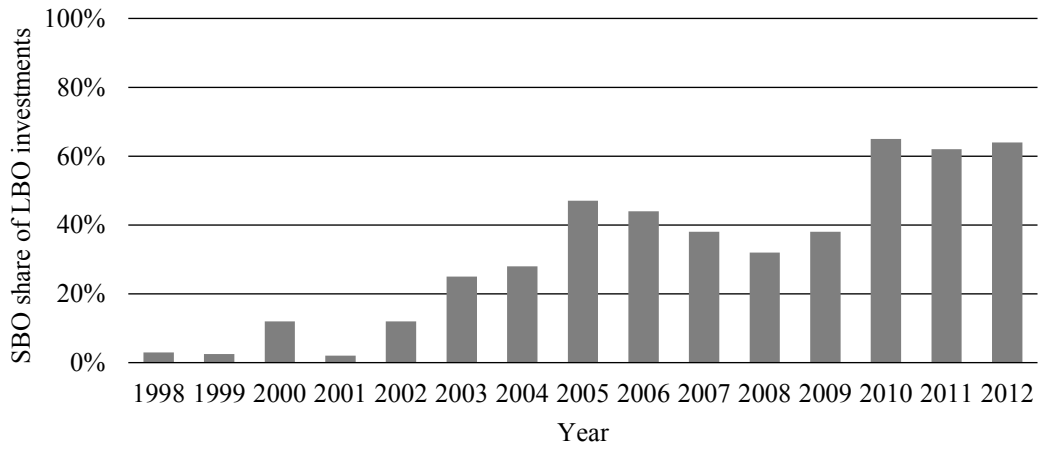

Figure 1: SBO share of total LBO investments by year (Bonini 2015)

The skepticism towards SBO deal performance can be divided into three reasons: limited operational value creation potential, the dependency of attractive debt

markets and the overpricing of SBO deals due to bargaining power of the selling financial sponsor (Achleitner & Figge 2014, Jenkinson & Sousa 2015). The claims are supported by the findings which show that the returns of SBOs have been positive but significantly lower compared to PBOs (Bonini 2015). However, other studies have shown that the value creation strategies being different from PBOs, SBOs still have equal returns on investment compared to PBOs (Achleitner & Figge 2014, Knauer 2014).

As mentioned, the value creation strategies differ SBOs from PBOs. PBOs often aim for operational margin and cash flow improvement to exploit the low-hanging fruits, whereas SBOs usually focus on business expansion through inorganic add-on acquisitions with higher leverage levels (Figge 2012, Knauer 2014). Despite the efficiency improvements done in target company during the first ownership, there often is room for further improvements due to several different reasons. The complementary skills and advantages of the second financial sponsor such as size, geographic reach, network, industry, functional expertise are levers that facilitate the value creation also during the second PE ownership (Figge 2012). Also, the pressure on both the seller and buyer side can have effect on returns and the pricing of the deal, but on average SBOs are found to be more expensive compared to other buyouts (Achleitner & Figge 2014, Wang 2012).

PE firms may feel pressure to invest its unused funds also known as “dry powder”. This “money burning” activity may be reasoned to facilitate fundraising in the future by generating tangible track record or securing a stable cash flow (Jenkinson & Sousa 2015, Strömberg 2008, Wang 2012). The reasons above support the claim to make bad investments on the buying PE firm side and may not be aligned with the interests of the limited partners (Achleitner & Figge 2014). In opposite, the selling PE firm may feel the pressure to liquidate its investments when the fund starts reaching the end of its lifetime and end up selling the target without completing all the value creating activities (Jenkinson & Sousa 2015). Also, the longer a portfolio firm has been held, the more probably it is exited via a secondary buyout (Wang 2012).

1.2 Research objective and questions

SBOs represent already a majority of buyouts and it is likely that majority of the PE funds choose to invest in SBOs or exit their investments via SBO. Considering the earlier research providing differing results on the deal performance of SBOs, it is interesting to study how SBO investments and exits affect the fund performance.

How does the secondary buyout share of investments and exits affect the fund performance?

The characteristics and strategies of the funds affect the investment and exit decisions by delimiting the target industries, geographical locations and size of the companies. The size of the fund has been mainly found to positively affect the fund performance.

How does the size of the fund moderate the fund performance?

To better understand the motives for SBO investments and exits but also the investment strategy of the funds, it is interesting to study the stage of the fund when the SBOs are made. Earlier research has claimed that SBO investments are often made due to uninvested funds whereas funds are forced to SBO exits due to time pressure to liquidate investments.

How does the timing of SBO investments and exits moderate the fund performance?

Since the SBOs, as leveraged buyouts in general, are dependent on high leverage, they are also dependent on the credit conditions. Thus, it is interesting to study how the credit conditions at the time of SBOs affect the fund performance.

How do credit spreads at the time of SBO investments and exits moderate the fund performance?

1.3 Research design, methodology and scope

1.3.1 Research design and methods

The research consists of two parts – the theoretical and the empirical part. First, the theoretical part is a literature review on the academic research on secondary buyouts and private equity deal and fund performance in general. The aim of the literature review is to better understand the factors affecting the motives for secondary buyouts and private equity fund performance. Previous findings of the literature on the topic is used to generate hypotheses to be tested in the second part of the research. Secondly, a quantitative approach is then used to validate the hypotheses. The Preqin database is used as the main data source and the data set is constructed by combining deal-level data with fund-level data to link the deals with the corresponding funds. The analysis will be conducted using the statistical software Stata using multiple linear regression.

1.3.2 Data sources

The data used in the quantitative analysis is retrieved from Preqin, which is globally the leading source of data and intelligence service for the alternative assets industry. The data in Preqin is sourced via direct contacts to the leading professionals in the industry. In this thesis, fund-level data is retrieved from the Performance Analyst database, whereas deal-level data is retrieved using the Buyout Deals Analyst database.

1.3.3 Scope and limitations

Prior research has studied the deal performance of secondary buyouts compared to leveraged buyouts in general and the motives for secondary buyouts. Still, to the best of my knowledge, not much research has been made on the role of secondary buyouts in buyout funds and the characteristics of the funds with different SBO investing strategies. Arcot et al. (2015) have previously studied the effect of buying pressure on funds' engagement in SBOs and its effects on fund performance. The

objective of the study is to globally study the IRRs of leveraged buyout funds including secondary buyouts and further study the effect of the share of SBO investments and exits on the fund performance.

The main focus of this thesis is on secondary buyouts and buyout funds while the characteristics of private equity investing in general are discussed to build a better understanding on the differences of secondary buyouts as a special case within leveraged buyouts.

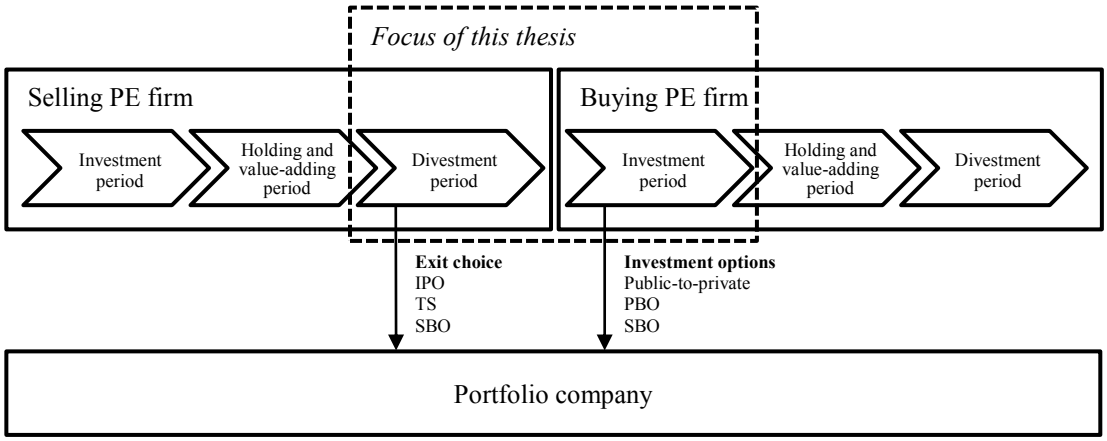

Figure 2: Focus of the thesis

The reliability of the theoretical part is ensured by providing an objective outlook on the research made on the topic with a broader view on private equity and leveraged buyouts. The relevant articles were gathered through systematic search of literature using Google Scholar, relevant journals and other databases. To ensure a higher saturation, the lists of references of the articles were gone through to find more research on the topic and review the original sources of arguments and findings.

The empirical part of this thesis has a specific focus on only buyout funds and SBOs. In this part, the scope is the global buyout market with limitations in time period selected. The data is gathered from the Preqin database which is the most regularly quoted source of the industry in which the data is gathered using direct contacting with the leading professionals of the industry. Due to the voluntary reporting of performance information, the database lacks detailed information for most deals and funds.

1.4 Structure

This thesis consists of 5 chapters. After the first introduction chapter, the second chapter is the literature review. This theoretical part of this thesis focuses on private equity as an asset class in general with the special focus on leveraged buyouts and further, on secondary buyouts as a special case of leveraged buyouts. First, the literature review aims to provide a general outlook on the private equity model, the private equity fund lifecycle and agency issues between the parties in the limited partnerships. Secondly, the characteristics of secondary buyouts are discussed as a special case of leveraged buyouts. SBOs are scrutinized from both the sellers' and the buyers' perspective to better understand the motives for SBOs. Thirdly, private equity fund performance is discussed on a general level to better understand the drivers and deterrents affecting the leveraged buyout fund performance. Finally, the hypotheses are formed based on the synthesis of the literature review.

In the third chapter the general information of the data and sample used in the analysis are presented. Also, the research method and variables are discussed, and the regression models of the study are formed and explained. In the fourth chapter, the focus is solely on the analysis including the descriptive analysis of the data and the results of the regression analysis. The results of the analysis are explained in this chapter before the theoretical and practical implications that are discussed in the fifth chapter. The fifth chapter also includes analysis of the validity and reliability of the research, provides a conclusion of the findings and discusses the opportunities for further research on the topic.

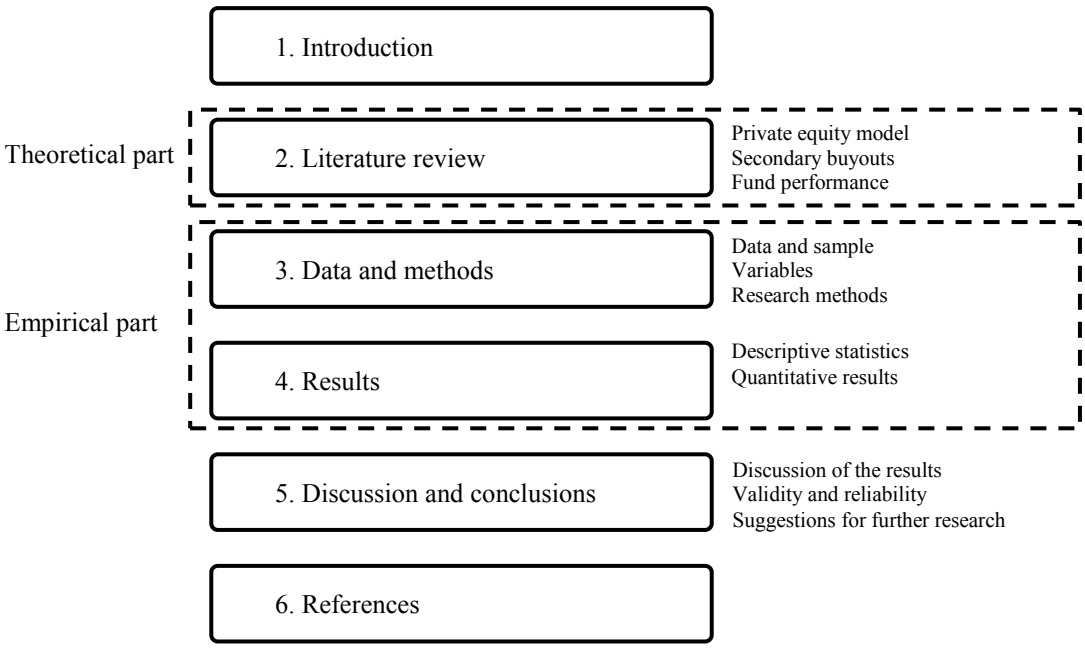

Figure 3: Structure of the thesis

2. Literature review

2.1 The private equity model

Companies can be state-owned, owned by institutions, families and individuals, stock-listed or backed by private equity. Private equity is an asset class in which investments are made in companies that may have been previously public- or private-owned and offer development potential to exploit and thus, generate returns to the owners. Private equity can be divided into venture capital (VC), enterprise capital (EC) and buyouts (BO). Venture capital is about investing in start-ups or young companies that have a lot of growth potential but there is often a higher risk involved since companies are still establishing their business. Venture capital investors usually do not aim to obtain the control over the company. Enterprise capital or growth capital is a form of investment into a more established and mature company that is looking for capital to facilitate growth, product development or internalization. The form of capital may be stock equity or mezzanine debt. In buyouts, a PE firm acquires all or the majority of an established company to take over the control of the company. (Invest Europe 2016a, Kaplan & Strömberg 2009, Ljungqvist et al. 2008, Metrick & Yasuda 2011) In 2016, buyouts accounted for nearly 70% of total private equity investments in Europe (Invest Europe 2016b).

Further in this thesis, the focus will be on buyouts and the term PE firm will refer to investment companies that use leveraged buyouts as their main form of investment. PE firms use active ownership to create value in their portfolio companies, acquired using own equity, equity invested by limited partners and market debt. The private equity limited partnerships are established between two parties, the general partners (GP) i.e. the PE firms or fund managers and the limited partners (LP) i.e. the external investors of the fund as illustrated in figure 4. In the limited partnership model, the GP retains the managing control over the general management of the PE fund (PEF), the investment decisions and steering of the portfolio companies using the controlling power through the board of directors. (Axelson et al. 2009, Cumming et al. 2009, Kaplan & Strömberg 2009, Schmidt et al. 2010)

In the private equity model the GP is incentivized to manage the fund and create value typically by being compensated in two ways that are also illustrated in figure 4. The fixed management fee is typically 1.5-2.5% of the capital committed which incentivizes the GP to invest as much as possible in the early in the life of the fund. (Chung et al. 2012, Kaplan & Schoar 2005, Ljungqvist et al. 2008) The second way of compensation is the carried interest which is typically 20% of the profits of the fund exceeding a specified hurdle rate which typically is 8%. The limited partners receive all the profits up to the hurdle rate after which the GP has a catch-up period where it receives 100% of the profits exceeding the hurdle rate until its carried interest is typically 20% of the total profits. All additional profits are then divided as agreed, typically 80-20 between the LPs and the GP (Figge et al. 2012, Robinson & Sensoy 2013).

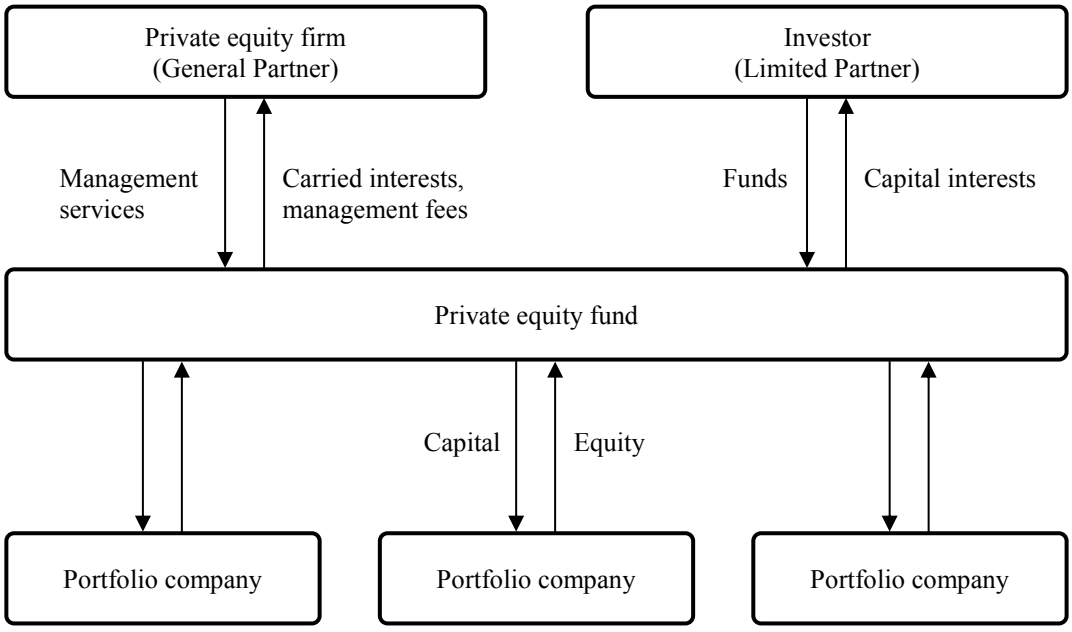

Figure 4: Limited partnership structure and relationships. Based on Bachelder (2007).

In the private equity model, the PE firm first collects capital commitments to establish the fund. In buyout funds, the capital is mainly collected from investors, the LPs, that typically are pension funds (41% in 2016), funds of funds & other asset managers (17%), insurance companies (14%) and sovereign wealth funds (12%) (Invest Europe 2016c). General partners usually also invest in the fund with commitments usually at least 1% percent of the total capital but in some cases up to

10% while the median and average have varied from 2 to 4% and from 5 to 8%, respectively during the past ten years (Jacobius 2017, Kaplan & Strömberg 2009). The development of the commitments over time is presented in Figure 5. Despite, the strong growth of the private equity markets, discontent has appeared among the investors due to the incapability of PE firms to provide decent and persistent returns for the investors over the past years (Braun & Schmidt 2014). The agency conflict between GPs and LPs is one reason behind the volatile returns and will be discussed later in section 2.3.5.

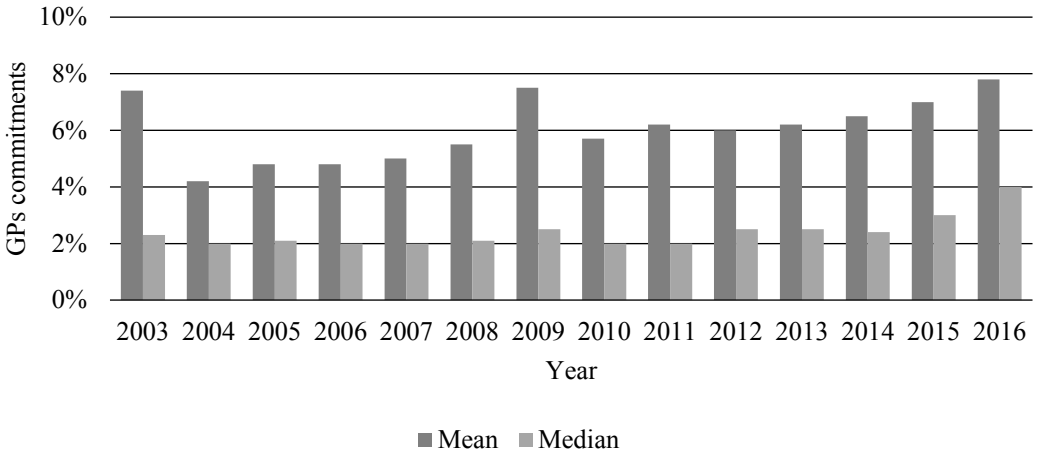

Figure 5: Average capital commitments by GP as percentage of fund size by vintage year (Jacobius 2017)

PE firms aim to acquire underperforming companies with development potential, that offer short- to medium-term value creation opportunities to exploit and thus, create value for the investors (Barber & Goold 2007). During the ownership period, the PE firm aims to exploit the "low-hanging fruits" and implement financial and operational improvements to provide the owners with positive returns through positive cash flow and higher equity value at exit (Achleitner & Figge 2014). The different strategies of value creation are further discussed in section 2.3.3.

2.2 Buyout fund lifecycle

2.2.1 Lifespan

Buyout funds typically have a finite lifespan, usually 10-13 years, whereas individual investments are typically made for 3 to 5 years (Cumming et al. 2009, Jenkinson & Sousa 2015, Kaplan & Strömberg 2009). The fund lifecycle of the fund can roughly be divided into five first years of investing the committed capital of the fund and into the additional five to eight years of returning the invested capital to the investors (Kaplan & Strömberg 2009). Despite the finite nature of the PE funds, the lifespan of a fund can be negotiated to be continued with the approval of limited partners, in case there are still investments to be liquidated and great value creation potential to be realized. Research has shown that the lifespan of buyout funds has been increasing during the past years and in 2014 already reached a median lifespan of over 13 years whereas the median lifespan was nearly two years less in 2008 (Palico 2015). Cumulative cash flows of PE funds usually follow a J-curve shape as in the early stage of the fund largest drawdowns are made but few returns are achieved. The lifecycle of a private equity fund can be divided into 4 phases based on Schmidt et al. (2010). The phases are further illustrated in figure 6.

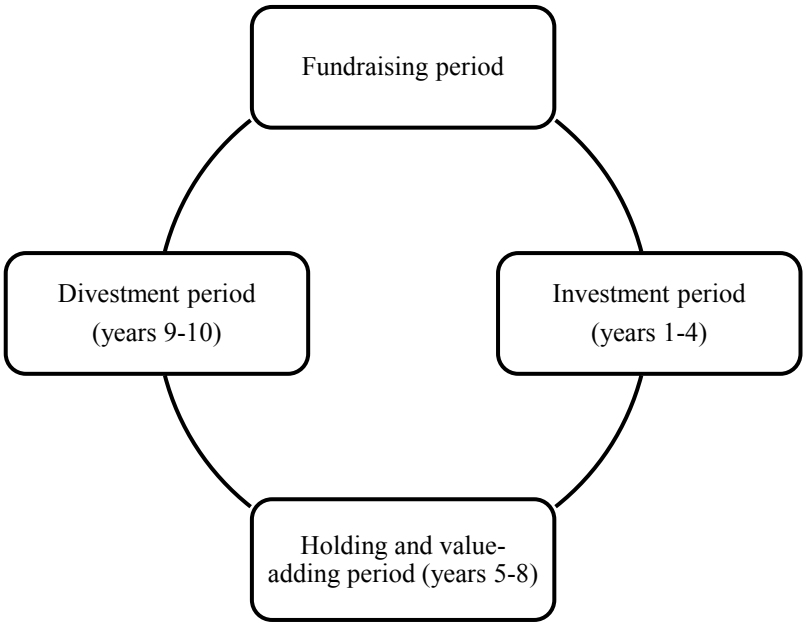

Figure 6: PE fund lifecycle

2.2.2 Fundraising period

In buyouts by PE firms, the companies are usually acquired using a relatively large portion of senior debt arranged by a bank or investment bank, hence the term leveraged buyout. Typically, buyouts are financed with 60 to 90 percent debt whereas the remaining 10 to 40 percent of the purchase price is financed with the funds from the investors (Kaplan & Strömberg 2009). Private equity funds (PEF) usually raise capital at the time they are established by the PE firms. First, PEFs collect capital commitments, binding agreements to invest a certain sum when an investment decision is made, from the investors and the GP later makes the capital calls i.e. requests for the committed capital to be contributed (Lore 2017).

Despite the 10-year lifecycle of an individual fund, PE firms have a strong incentive to establish a new large fund already before the investment period of the previous fund ends. PE firms aim to ensure a stable income stream through non-performance-related management fees that usually are directly linked to the fund size (Braun & Schmidt 2014, Metrick & Yasuda 2010). Also, if the capital of the fund is invested with only inferior deals left, there is little rationale for the GP to spend the rest of the fund's lifespan managing the portfolio with uncertain expectations of the returns (Braun & Schmidt 2014). Prior research has shown that on average, successful PE firms raise a new fund every three to five years (Chung et al. 2012, Metrick & Yasuda 2010) but within six years at the latest (Braun & Schmidt 2014).

The ability to raise capital for new funds is strongly dependent on GP's shown capability to provide returns on investment and declining private equity returns will also lead to declining commitments (Kaplan & Strömberg 2009). Thus, the pressure to provide returns in the early phase may lead to sub-optimization by realizing investments that would still have value creation potential (Kaplan & Schoar 2005). In fact, the GPs need to balance short-term interests and long-term reputation to ensure the ability to raise new funds but also provide the investors with great returns throughout the fund lifecycle. However, the returns to investments are found to be higher for investments exited when the fund is raised compared to the investments exited after the closing of the new fund (Braun & Schmidt 2014).

2.2.3 Investment period

PE funds make most of their investments about two to three years into the life of the fund and the investment period typically lasts 3 to 5 years (Jenkinson & Sousa 2015, Ljungqvist & Richardson 2003). On average, the investments are made 3,3 years into the life of the fund (Braun & Schmidt 2014). According to Ljungqvist & Richardson (2003), on average, PE firms have invested 57% of the capital by the end of the third year and 90% of the capital by the end of the sixth year of the fund and have invested 94% of their capital by the expected ending year of the fund which strongly indicates that the investments are made early in the lifecycle of the fund.

Most of the capital committed very early on into the life of the fund is reasoned by a few factors. Firstly, GPs aim to make their investments early on so that they are able to invest in the most promising target companies before new PE funds emerge to exploit the same opportunities (Ljungqvist & Richardson 2003). Secondly, the fund managers identify the most attractive portfolio companies to exit at the early stage of the fund and consequently divest those companies during the following two or three years to provide investors with early returns and thus, improve their reputation in order to facilitate fundraising in the future (Braun & Schmidt 2014, Wang 2012). Thirdly, the compensation of the GPs is dependent on the management fees based on the capital invested which motivates to invest most of the capital early on into the life of the fund (Braun & Schmidt 2014).

Despite the motives to invest most of the funds at the early stage, PE firms carefully evaluate the target companies to maximize the returns for investment. Especially large PE firms with good reputation and strong relations have sophisticated processes of screening, due diligence and valuation of the target companies to maintain the high quality of their portfolios (Schmidt et al. 2010). Larger and older PE firms also have higher quality deal sourcing and more resources available to profoundly evaluate possible deals and the more selective deal consideration also correlates with better performance (Gompers et al. 2016). Younger funds tend to invest in riskier deals to establish a good track record but quickly become more conservative after periods of good performance (Ljungqvist et al. 2008).

PE firms usually have certain industry focus and experience which limits the number of potential companies to acquire but prior successful investments in a certain industry likely lead to greater returns also with the following investments in that particular industry (Gompers et al. 2016). However, the industry or market of the company is not considered as a major factor in the selection process of the investment targets. The most important factor in the evaluation process is the business model and competitive position of the target company (Gompers et al. 2016). Even though the industry is not considered as the most important factor in the deal selection process, PE funds have a defined investment strategy that they aim to follow consistently. Style-inconsistent investing or style drifting is viewed negatively indicating lack of knowledge and skills to properly manage the portfolio of companies. Limited partners are worried that investments that differ from the fund objectives may lead to underperformance and thus to lower returns. (Cumming et al. 2009)

2.2.4 Holding and value-adding period

The main objective of private equity firms is to increase the equity value of the portfolio company and to exit the investment at a higher price than what the company was acquired for. After making most of its investments, the next goal of the PE fund is to add as much value to its portfolio companies during the holding period. The average holding time of portfolio companies is slightly less than five years (Jenkinson & Sousa 2015, Mäkiaho 2016). Shorter holding time is rationalized by higher IRR but sets constraints to the actions that can be implemented and harvested during such a short period time. Sophisticated investors also quickly divest their living-dead non-performing investments and rarely keep them in their portfolio in hope of a turnaround (Schmidt et al. 2010).

The value-adding actions that the GPs carry out can be classified into three categories: financial engineering, governance engineering and operational engineering (Gompers et al. 2016, Kaplan & Strömberg 2009). The strategic choices made by the GPs are not only driven by the industry and competitive position of the company but also by the background of the fund managers and their differing skills

(Achleitner & Figge 2014, Gompers et al. 2016). Fund managers with background in investment banking and financial sector in general tend to focus more on financial engineering whereas background in management consulting leads to more focus on operational engineering (Gompers et al. 2016). Governance engineering is one of the key advantages of PE ownership compared to listed companies. By actively steering the company and providing strong and better aligned incentives for the company management, the PE firm can achieve significant improvements in the performance of the portfolio company. After the investment, over half of the PE firms recruit new senior management teams to replace the existing management team. In about one third of their investments, GPs aim to create value by changing the strategy and business model of the company. (Gompers et al. 2016)

Regarding operational engineering, the most important source of value creation is the organic growth in revenue before follow-on acquisitions and reducing costs. Smaller companies achieve their EBITDA growth via revenue growth whereas larger companies rely more on reducing costs (Achleitner et al. 2010). In their research Achleitner et al. (2010) revealed that 79% of the EBITDA growth was driven by revenue growth whereas 26% was contributed by margin expansion. The total impact of operational engineering in the research was 46% of the total value creation whereas the impact of financial engineering or leverage effect was 32%. The differences in value creation strategies of SBOs are further discussed in chapter 2.3.3.

2.2.5 Divestment period

Private equity firms buy only to sell (Barber & Goold 2007). The divestment period is the most important phase of the fund in the sense that the returns are realized once the portfolio company is exited. Thus, GPs plan their exit strategy already in the investment phase of the fund when they are screening potential target companies or right after the acquisition (Schmidt et al. 2010, Wang 2012). In ideal situation, PE firms hold their portfolio companies until they have realized the maximum value creation potential and achieve maximum payoff (Wang 2012). However, PE funds typically have finite life and thus, their portfolio companies must be exited

eventually. The approaching end of the fund's lifespan affects the exit decision and often the exits made late into the life of the fund provide lower deal returns (Figge et al. 2012).

The prolonged holding time of investments deteriorates the internal rate of return of the investments. Thus, it is rational for the GPs to realize investments early on. However, the holding time is dependent on many factors. For example, higher competition for deals at the time of investment extends the holding time due to investments that require more efforts on value creation (Ljungqvist & Richardson 2003). The investments realized three years after the fund's closing of usually yield the highest IRRs whereas exits later in the fund's life start showing decreasing returns but the returns of the remaining deals lie between these two extremes. (Braun & Schmidt 2014). In addition to higher deal returns, PE firms have strong incentives to exit investments at the early stage of the fund to facilitate future fundraising (Wang 2012). GPs aim to maximize the returns of their funds in the long run and thus, compromising between the income from the currents funds in favor of the future returns from larger funds may be the most valuable (Chung et al. 2012, Figge et al. 2012). The larger size of the fund leads to higher revenues per partner but lower revenue per dollar (Metrick & Yasuda 2010).

2.2.6 Exit routes

Private equity funds practically have three exit route options for their investments: initial public offering, secondary buyout or trade sale. The academic research has traditionally viewed IPOs as the preferred exit route for private equity investments (Jenkinson & Sousa 2015) and suggested that the exit route is driven by the quality of the exiting company where IPO is most likely for highest quality companies (Achleitner et al. 2012). In fact, the share of exits via IPO has used as a proxy for performance especially in venture capital studies (Hochberg et al. 2007, Sørensen 2007). However, the recent studies have shown SBO exits to provide returns comparable to the returns of IPO exits (Achleitner et al. 2012, Jelic & Wright 2011) The choice between the exit routes is dependent on PE firm and portfolio company characteristics as well as market conditions. Smaller companies that have experience

high operational growth are more likely to exit via trade sale while companies go public more during times of rising markets. (Cumming et al. 2009, Jenkinson & Sousa 2015).

Trade sales and especially secondary buyouts are viewed more as an alternative for IPOs in situations where the PE fund is approaching the end of its lifecycle and has distributed only few capital back to investors and thus, is pressured to realize its investments (Figge et al. 2012, Jelic & Wright 2011). A secondary buyout becomes a more likely option the longer a portfolio company has been held (Harford & Kolasinski 2013). The advantage of these options is the shorter time required to complete the transaction. In IPOs, the seller can sell only a proportion of its holding at once and is tied to a lock-up period whereas in secondary buyouts the seller can immediately realize the returns (Figge 2012, Jenkinson & Sousa 2015). Despite the outstanding effect on returns of IPOs based on prior research, only 20% of the deals are exited via an IPO whereas. Roughly half of the deals are sold strategic buyers via trade sales and 30% of the deals to financial buyers via SBOs (Arcot et al. 2015, Gompers et al. 2016, Strömberg 2008)

2.3 Secondary buyouts

2.3.1 Characteristics of secondary buyouts

The private equity market has experienced strong and rather steady growth since the middle 1990s except for a major collapse after 2007 due to the global financial crisis. The total private equity deal volume has increased from single digits to over half a billion in 20 years with a peak in 2007 just before the financial crisis as can be seen in figure 7. (Bonini 2015, McKinsey's Private Equity and Principal Investors Practice 2017) During this time, secondary buyouts have been an increasing fraction of the total buyout volume. In the late 1990s SBOs accounted only for less than 10 percent of total buyout volume, whereas in the 2010s SBOs have already accounted for a majority of the total LBO volume (Bonini 2015, Degeorge et al. 2016). While the average holding time of investment of leveraged buyouts is slightly less than 5 years (Jenkinson & Sousa 2015, Mäkiaho 2016), a median LBO is still private equity

owned after 9 years from the original buyout transaction (Strömberg 2008). The prolonged private equity ownership time and increased market of SBOs have increased interest towards the research on SBOs, and have raised several concerns on their motives and profitability.

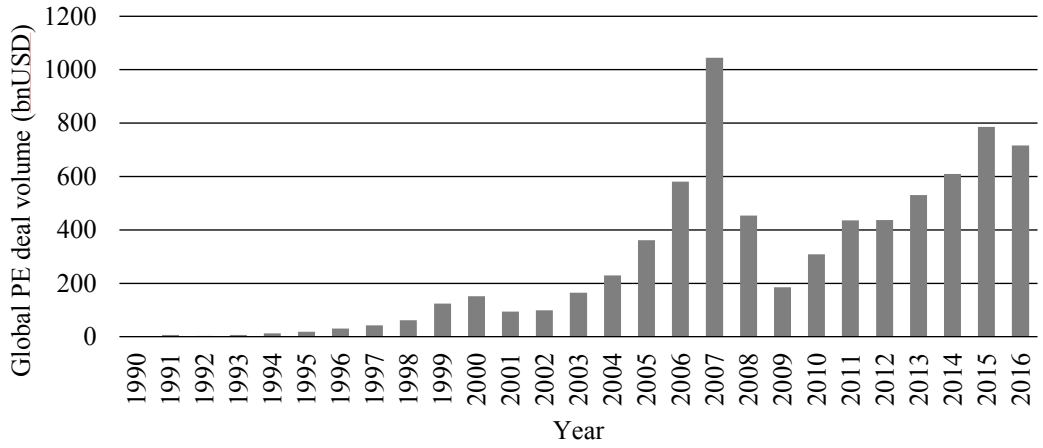

Figure 7: Global private equity deal volume (McKinsey's Private Equity and Principal Investors Practice 2017)

Secondary buyouts have been historically considered as worse exit choice compared to the alternative exit routes. Successful deals have been expected to exit via IPOs and trade sales whereas SBO exits have been claimed to be distresses transactions, exit choice of last resort, and claimed to generate lower returns to investors (Bonini 2015, Jelic & Wright 2011, Jenkinson & Sousa 2015). However, there are some studies that show SBOs to provide equal returns on investment as PBOs proving the utility of SBOs in varying market conditions. For example, Achleitner et al. (2012) show that the returns of SBO exits are equal to returns achieved via IPO exits and even superior to trade sale exit returns.

From the perspective of the buying side, SBO investments are in some studies blamed to be a money burning device and to create interest conflicts between GPs and LPs (Arcot et al. 2015). The economic rationale behind the SBOs has been unclear since the operational margin improvement has found to be significantly lower compared to PBOs and the deals to be primarily motivated by reasons such as investor reputation boosting, temporary economic conditions and reciprocity. (Bonini

2015, Knauer 2014) However, the findings of Knauer (2014) show that neither the operational performance measures sales and EBITDA nor the growth of total asset are significantly lower than the performance and asset growth of PBOs. Also, according to the research by Degeorge et al. (2016), SBOs provide comparative returns in normal conditions and underperform only when transactions are done under buying pressure.

2.3.2 Motives for secondary buyouts

The motives of secondary buyouts are questioned by several researchers but still the share of SBOs has been increasing over the years. Existing research presents four factors that motivate leveraged buyouts in general but it still remains unclear which of the following motivate GPs to invest in SBOs (Bonini 2015). Firstly, increasing operational performance through cost reduction and operational engineering actions will increase the multiple and discounted cash flow valuation of the company acquired. Secondly, PE firms use financial engineering with an aim to benefit from the mispricing in the debt and equity markets. Thirdly, value can be added through value transfers from employees and the government in form of wage and tax savings. Lastly, PE firms may have intentions to exploit reciprocity by helping each other to exit investments at the expense of limited partners.

SBOs are found to have positive returns yet significantly lower than PBOs which may still tempt GPs to use them as shortcut to positive returns and facilitator of follow-up fundraising (Bonini 2015). However, as discussed previously in this thesis, some researchers claim that the operational performance of SBOs is comparable to the one of PBOs. Despite the operational efficiency improvements done during the primary PE ownership, SBOs are shown to be capable of adding value by executing different value creation strategies and achieve comparable returns (Knauer 2014). This is in line with the finding by Strömberg (2008) that companies stay under PE ownership for nine years whereas average holding time is less than 5 years (Jenkinson & Sousa 2015, Mäkiaho 2016) indicating that there is still value creation potential left. However, the opposing findings on the operational performance

(Bonini 2015, Wang 2012) necessitate to shed more light on other motives for investing in SBOs.

Many studies have shown that the PE firms seek to exploit the changes in the capital markets and benefit from favorable debt markets (Achleitner & Figge 2014, Jenkinson & Sousa 2015, Wang 2012). Other often mentioned motives for SBOs are their usage to improve and maintain the track-record and reputation of the GP (Achleitner & Figge 2014, Jenkinson & Sousa 2015, Wang 2012), solid cash flows (Achleitner et al. 2014, Bonini 2015, Strömberg 2008) and the monetary incentives through the management fees to GPs (Braun & Schmidt 2014). Due to solid cash flows and perhaps less riskier investments, SBOs can also be a strategic choice to balance the fund portfolio by compensating riskier investments that yield higher returns (Bonini 2015). The different motives for SBO investments and differences in value creation strategies are further discussed in the following sections.

While some of the motives for SBO investments also apply for the SBO exits, there are several reasons that are found to impact the exit route decision for investments. Firstly, similar to SBO acquisitions, PE firms exit their portfolio companies via SBOs to improve their track-record of successful exits and exploit the favorable debt and equity markets to achieve higher exit valuation (Figge 2012). Secondly, SBOs are often an easier and faster way to exit an investment compared to IPOs and trade sales and thus, SBO exit is chosen when the seller is under pressure (Jenkinson & Sousa 2015). An exit via SBO is often chosen at the later stage in the life of the fund (Jenkinson & Sousa 2015) and when the investment has been held longer (Wang 2012) when the GP is pressured to return capital to the LPs.

2.3.3 Value-adding strategies

One of the main critiques on SBOs is their lack of operational efficiency development potential (Achleitner & Figge 2014, Knauer 2014, Wang 2012). This is due to the fact that PE firms aim to exploit most of the development potential during the primary ownership and often leave few potential to be easily realized. Since most of the PE firms rely on same tools and information, it remains unclear why would

any other GP acquire a company that provides less marginal return of value than the marginal costs of the investment to capture the corresponding value (Achleitner & Figge 2014). Prior research on the operating performance of SBOs has revealed that the improvement in profitability is significantly lower for SBOs in comparison to PBOs (Bonini 2015, Knauer 2014, Wang 2012). Thus, it is justified to question operational efficiency development as a main motive for SBOs.

Due to the limited margin improvement potential, the acquisition strategy of SBOs is supported by the profit expansion through revenue growth of an already efficiently managed company (Knauer 2014, Wang 2012). However, the revenue growth is achieved to the detriment of profitability margin (Wang 2012) yet the negative combination effect was found to be marginal in a research on LBOs in general (Achleitner et al. 2010). In comparison to the PBOs, inorganic growth strategies are conducted more frequently in SBOs. In his research, Knauer (2014) finds that add-on acquisitions were conducted in more than half of the cases studied while none was conducted during the primary ownership period. Thus, the SBOs can be well justified also in the sense of operational engineering.

The strategies for improvements in operational efficiency and expansion of the revenues are not that unambiguous that the rationale for SBOs could be universally contradicted. The experience and specialization of the primary owner of the portfolio company can have effect on the exit choice (Jenkinson & Sousa 2015). Actually, SBO transactions made between PE firms having complementary skill sets and background are found to generate superior returns for the buying side in comparison to the transactions made between PE firms having similar skill sets (Degeorge et al. 2016). Complementary skills and advantages of the secondary PE firm, such as size, geographic reach, network, industry and functional expertise, will offer new sources and levers for implementation of value adding strategies (Figge 2012). The background of the founders of firms has effect on the value creation strategies chosen. Financial background of the founders increases the usage of financial engineering whereas firms with background in private equity and operations are more focused on operational engineering (Gompers et al. 2016).

2.3.4 Dependency on attractive debt markets

As discussed earlier in this thesis, the attractive debt markets may drive GPs to overpay for deals due to the cheap leverage available. This may cause the returns of the investment to decline causing an agency conflict between GPs and LPs. SBOs have been found to be overpriced in many previous studies (Achleitner & Figge 2014, Wang 2012). The overpricing is argued to be due to the market timing and negotiation power exercised by the selling GPs that aim to maximize their value received in exit (Achleitner & Figge 2014). On the other hand, when more debt is available (Axelson et al. 2013) and the funds have a lot of uninvested committed capital (Jenkinson & Sousa 2015), GPs are more willing to invest in secondary buyouts and pay higher prices. The effect of the volatile debt markets is stronger for profitable companies with higher levels of cash-flow and low capital expenditures (Jenkinson & Sousa 2015).

Partly due to overpayment and lower threshold to make investments during boom times when cheap debt is available, buyouts become more leveraged (Axelson et al. 2013) and the average returns to investments are lower in comparison to the investments made during recession (Achleitner et al. 2010, Axelson et al. 2009). The higher prices and higher leverage have not shown to lead to any additional value creation potential (Wang 2012). However, favorable market conditions and good investment opportunities lead to faster investing and exiting pace and also to better returns on investments (Ljungqvist & Richardson 2003).

Unlike public company leverage, the leverage of buyouts is highly dependent on the changes in the debt market conditions. SBOs are typically highly levered transactions and hence the equity structure leads to a strong dependency on debt and equity market conditions (Axelson et al. 2013). The availability of debt and the leverage effect have been important factors in the increasing amount of PE investments during the 21st century (Achleitner et al. 2010). Easy availability of debt and excessive leverage may be detrimental to the LPs if GPs also make value-decreasing investments driven by their compensation model that rewards invested capital no matter the deal performance (Axelson et al. 2013).

GPs aim to exploit the market mispricing by balancing between debt and equity availability (Kaplan & Strömberg 2009). SBO exits are more likely to occur during cold equity markets when the industry IPO volume is low (Wang 2012). This highlights the usage of SBOs as an alternative exit route for investments and Jenkinson & Sousa (2015) even suggest that the capital market conditions determine the exit route more than any other factor. Overall, the private equity market activity is sensitive to changes in the recent returns, interest rates and stock market values (Kaplan & Strömberg 2009). The underperformance of SBOs cannot be generalized since there is no clear evidence that the returns are significantly lower when controlling for debt market conditions (Achleitner & Figge 2014).

2.3.5 Pressure to invests and money burning

General partners are pressured to invest the committed capital of the limited partners to achieve returns for the investment in the future but also to get compensated through the management fees. The uninvested capital, also called dry powder, is unrealized potential for both the GPs and LPs and thus, the pressure to invest the funds increases as time passes. In addition to the financial motives, the GPs are constantly trying to maintain their reputation as investors and trying catch up on their investment rate to signal the quality of their investment pipeline and to facilitate future fundraising (Achleitner & Figge 2014, Bonini 2015). Thus, the GPs aim to invest as much of their capital committed and sometimes to the detriment of the LPs. In some cases, the LPs may find themselves on both sides of the transactions which for them is only an additional expense through transaction fees and other expenses related to the screening and due diligence (Degeorge et al. 2016).

The pressure to invest is dependent on market conditions. When there are a lot of tempting investment opportunities the investment pace is higher and GPs find more easily target companies to acquire leaving less funds unused (Ljungqvist & Richardson 2003). The trend on the PE market has been a quickly increasing amount of committed but uninvested capital with CAGR of 4% between 2010 and 2015. However, the increase amount of dry powder is lower than the increase in assets under management between 2010 and 2015. (McKinsey's Private Equity and

Principal Investors Practice 2017) This can be interpreted as decreased investing pressure caused by the uninvested capital.

On average, secondary deals are made later in the investment period of the fund which can be an indicator that secondary buyouts are an alternative option when there are no good primary deals available but the buying side is under pressure (Arcot et al. 2015, Jenkinson & Sousa 2015). Also, the deals made later into the life of the fund tend to underperform other buyouts and carry more risk (Degeorge et al. 2016). The pressured buyouts are also conducted using less leverage and fewer syndicates in comparison to buyouts in general which is associated with lower fund returns on the fund level (Arcot et al. 2015). These findings support the common critique that SBO investments are often made under buying pressure to spend uninvested capital and show positive returns to investors to maintain and improve the reputation of the GP but are usually worse deals in terms of return for investment. However, the underperformance of pressured SBOs should not be generalized and not all SBOs should be considered as money-burning deals (Degeorge et al. 2016).

2.3.6 Pressure to sell and reciprocity

When the lifecycle of the PE fund is closing its end, the pressure to liquidate the investments increases and may force to exit the portfolio companies with worse returns via an alternative exit route and leave the fund with unexploited value creation potential (Figge et al. 2012). Pressure to divest may also originate from the need to raise a subsequent fund and thus, they try to show their capability of generating positive returns but also to achieve higher IRR with early exits (Jenkinson & Sousa 2015). Pressured sellers that need to promptly return capital to the LPs are more likely to engage in SBOs due to the quicker transaction in comparison to TS or IPO that may require favorable market conditions and be lengthier processes (Bonini 2015). However as noted earlier, the SBOs made under pressure typically provide worse returns (Arcot et al. 2015).

Pressured buyers and sellers share the same issues of finding ways to either quickly invest unused capital or quickly liquidate investments and SBOs seem to be an

important transaction to solve the issue. PE funds occasionally facing the same issues may agree to buy from each other in the way of reciprocity. Helping other funds to solve their investing or exiting difficulties will likely be compensate the other way around at some point (Bonini 2015). Reciprocity in SBO transactions will yield lower returns of the current funds, but GPs are trying to maximize their income from all future funds instead of individual funds (Figge et al. 2012).

Table 1: Findings of previous research on secondary buyouts

Research	*Focus*	*Findings*
Achleitner et al. 2012	SBO Exit	Returns comparable to IPOs Greater debt capacity leads to SBOs
Achleitner & Figge 2014	SBO Investment	SBO returns comparable to PBOs SBOs are more leveraged SBOs are more expensive
Achleitner et al. 2010	Value creation	Value creation is two thirds of financial engineering and one third of operational engineering
Bonini 2015	SBO Investment	SBO returns lower than PBO returns No operating performance improvement Favorable debt markets lead to increase in SBOs
Braun & Schmidt 2014	PE Exit	Deals exited before new fund closing outperform
Braun et al. 2017	Performance persistence	Deal performance persistence during low competition periods Weaker fund performance persistence than previously
Degeorge et al. 2016	SBO Investment	Pressured SBO investments underperform Complementary skills create value creation potential
Jelic & Wright 2011	SBO Exit	IPOs outperform TSs and SBOs
Jenkinson & Sousa 2015	SBO Investment SBO Exit	Exit choice depends on debt and equity market conditions SBOs tend to happen at a later point in the life of the purchasing fund
Knauer 2014	Value creation	Inorganic growth strategies are more often conducted in SBOs operational growth is similar for PBOs and SBOs
Schmidt et al. 2010	PE Exit	Market characteristics have no influence on exit choice
Wang 2012	SBO Exit	PE funds engage more in SBOs when equity and debt market conditions are favorable Pressured sellers engage more in SBOs

2.4 Fund performance

2.4.1 Drivers of fund performance

Private equity funds provide an attractive investment target for institutional investors. In comparison to direct investments in private companies, they offer a decentralized risk with an investment portfolio managed by the PE firm. Also, PE funds have shown to outperform public equity markets in several studies (Harris et al. 2014, Phalippou 2013, Robinson & Sensoy 2013). The average outperformance to the S&P 500 has been over 20% over the life of the fund and about 4% annually during the holding period (Harris et al. 2014, Robinson & Sensoy 2013) However, there are also studies that claim that the performance of the PE funds is actually below that of the S&P 500 (Kaplan & Schoar 2005, Phalippou & Gottschalg 2009) Also, due to the heterogeneity of the industry there are large differences between the performance of the sub-groups. Larger and more mature PE firms usually outperform smaller and younger firms (Kaplan & Schoar 2005).

In perfectly competitive capital markets, the returns of private equity investments should only depend on systematic risk (Kaserer & Diller 2004). However, due to the stickiness of the private equity capital and the market not being frictionless, the returns are dependent on factors such as characteristics of PE firm, competitive environment and macroeconomic factors (Ljungqvist et al. 2008). PE funds that are able to take advantage of these conditions should generate excessive returns.

In several studies, the size of the fund has been shown to positively correlate with the returns (Higson & Stucke 2012, Kaplan & Schoar 2005, Phalippou & Gottschalg 2009) whereas Humphery-Jenner (2012) shows a negative correlation between the fund size and returns. A fund's ability to raise a larger fund is strongly dependent on performance of prior funds (Phalippou & Gottschalg 2009). While the fund performance persistence has decreased, the performance of previous fund and experience of the GP have a strong impact on the performance of future funds (Braun et al. 2017, Kaplan & Schoar 2005)

A shorter holding time implies higher IRR and thus, the holding time is one of the key determinants of the fund performance (Phalippou & Zollo 2005). The holding time usually depends factors independent from the PE firm as is not the root driver of performance per se. The increased money flow to the industry leads to lower returns of funds close in that vintage year (Kaserer & Diller 2004). Consequently, high competition for deals at the time of investment leads for more cautious investment activity and to prolonged holding time of investments and consequently to significantly lower returns (Ljungqvist & Richardson 2003).

The performance of the funds is also highly dependent on the capital and credit market conditions. Funds earn higher returns when the credit market conditions loosen when they can exploit the easy access to leverage (Ljungqvist et al. 2008) while Axelson et al. (2013) note that high leverage leads to underperformance. Also, the some researchers have shown that macro-economic factors such as GDP growth and stock market cycles correlate positively with the fund performance (Phalippou & Zollo 2005). However, according to Diller & Kaserer (2009) the fund performance is unrelated to the stock markets and is actually negatively correlated with the growth rates of the economy. This is in line with the findings of Kaplan & Schoar (2005) who find that funds raised during boom times underperform.

Table 2: Drivers of fund performance

Drivers of fund performance	*Supportive research*
Fund size	Axelson et al. 2013, Higson & Stucke 2012, Humphery-Jenner 2012, Kaplan & Schoar 2005
PE firm experience	Diller & Kaserer 2009, Kaplan & Schoar 2005, Metrick & Yasuda 2010, Phalippou & Gottschalg 2009
Holding time of investments	Ljungqvist & Richardson 2003, Phalippou & Zollo 2005
Competition for deals	Kaplan & Schoar 2005, Ljungqvist et al. 2008
Credit market conditions	Axelson et al. 2013, Ljungqvist et al. 2008
Public market cyclicality	Diller & Kaserer 2009, Kaplan & Schoar 2005, Phalippou & Zollo 2005

2.4.2 Fund performance measures

The objective assessment of fund performance is difficult due to the subjective reporting of fund performance by the GPs (Kaplan & Sensoy 2015). The measures of fund performance are based on the net asset value (NAV) of the fund which relies on the assumptions of the GP. Internal rate of return (IRR) which is one of the most used measures for fund performance uses the NAV to estimate the returns. If the fund is not liquidated and it still has portfolio companies to be exited, the valuation is based on expectations and estimates. The funds start showing their full potential only around the eight year or more (Ljungqvist et al. 2008) However, in the study of Kaplan & Schoar (2005) the correlation between interim IRR and final IRR is found to be strong (0.89) which gives credibility to the interim value estimates. The IRR is mathematically expressed in the following way (Meyer & Mathonet 2005):

$$\sum_{i=1}^{n} \frac{CF_i}{(1+IRR_n)^i} + \frac{NAV_n}{(1+IRR_n)^n} = 0, \text{ where}$$

CF_i = cash flow between the fund and the investors at the end of time period i
n = number of time periods
NAV_n = latest net asset value of the fund
IRR_n = interim internal rate of return at time n

An alternative for IRR is the public market equivalent (PME) which is a measure that compares the returns of the fund to the returns that could have been achieved by investing in public equity (Kaplan & Schoar 2005). There are two variations of the PME. The Kaplan-Schoar PME (KS PME) uses the multiple of invested capital (MIC) and is calculated by comparing the discounted capital distributions of the fund to the discounted returns achieved by investing in public equity, usually S&P 500 index (Kaplan & Schoar 2005). The Long-Nickels PME (LN PME) uses the IRR of the fund and compares it to the IRR of the public stock market. The advantage of KS PME is that it provides the real-time information about the performance of the fund and can be calculated at any point in the life of the fund whereas the LN PME is based on IRR which is the most used measure for fund performance by investors. The disadvantage of KS PME is that it provides a cumulative measure instead of an

annualized measure (Kaplan & Sensoy 2015). The KS PME is mathematically expresses in the following way (Brown et al. 2015):

$$PME = \frac{\sum_{i=0}^{n} D_i \prod_{i=1}^{n} R_{i+1}}{\sum_{i=0}^{n} C_i \prod_{i=1}^{n} R_{i+1}}, \text{ where}$$

D_t = Fund distributions at time i

C_t = Fund capital at time i

R_t = Public market gross return over period i

2.4.3 Fund performance research

Buyout fund performance research has the earliest contributions from the beginning of the millennium. The first studies by Ljungqvist & Richardson (2003) and Kaplan & Schoar (2005) study the performance of venture capital and buyout funds with vintages from early 1980s. The sample of Ljungqvist & Richardson (2003) includes 19 VC funds and 54 BO funds with vintages ranging from 1981 to 1993 located in the US, Latin America and certain European countries. They show that the PE funds outperform public markets with an average net IRR of 18.1%. The sample of Kaplan & Schoar (2005) includes 577 VC funds and 169 BO funds that have performance data with vintages ranging from 1980 to 1995. They report an average IRR of 18% for the BO funds. They also report that larger funds outperform smaller ones and have better performance persistence over time. According to Gompers et al. (2016), LPs typically aim for a target IRR of 20 to 25%.

Similar to the finding of Kaplan & Schoar (2005), Phalippou & Gottschalg (2009) find that less mature and less experienced funds underperform. They use corresponding data sets but Phalippou & Gottschalg (2009) have an extended follow-up period for the cash flows. Contrary to the earlier studies, they do not find any evidence for the outperformance of PE funds using net asset value adjustments that correct the performance measures downwards. Phalippou & Zollo (2005) use a sample consisting of both US and EU private equity funds with vintages from 1980 to 1996. They find that fund performance positively varies with business and public

market cycles and that smaller and less experienced funds underperform negatively affecting the overall reported performance of PE industry.

Robinson & Sensoy (2013) use a sample of 295 VC and 542 BO funds with vintages from 1984 to 2009. They study the effects of compensation and ownership stake on the fund performance. Their findings show that higher compensation actually results in higher fund performance. Harris et al. (2014) study a sample of 598 BO funds vintage years ranging from 1984 to 2008. Their main findings support earlier evidence on the outperformance of buyout funds versus public markets. Similar to Diller & Kaserer (2009), they also study the effect of fund inflows on the fund performance. However, the studies find contradictory results as Harris et al. (2014) show that high inflow when fund is closed results in decreases returns whereas Diller & Kaserer (2009) provide evidence on higher returns.

Arcot et al. (2015) are the first researchers that have studied secondary buyouts and related fund performance. They study the effect of buy and sell pressure on fund performance and find evidence that funds investing under pressure are more likely to engage in SBOs which consequently is shown to lead to lower fund performance. Axelson et al. (2013) use an international sample with buyouts from 1980 to 2008 to study the effects of leverage and pricing on fund performance. They find that higher leverage is associated with lower fund returns caused by overpayment during favorable credit conditions. The findings of prior research on fund performance is presented in table 3.

Table 3: Findings of previous fund performance research

Research	*Factors*	*Findings*
Arcot et al. 2015	Buy pressure Sell pressure	Pressured funds engage in SBOs Funds investing under pressure underperform
Axelson et al. 2013	Leverage	High leverage leads to lower fund returns
Cumming & Walz 2010	GP & fund characteristics	More advice from GP leads to higher fund revenues
Diller & Kaserer 2009	Fund inflows GP skills & risks	High inflow when fund is closed leads to higher returns Returns are driven by GP's skills and risk
Harris et al. 2014	Fund inflows Fund size	Buyout funds outperform public markets High inflow when fund is closed decreases returns No relationship between fund size and returns
Higson & Stucke 2012	Fund size	Buyout funds outperform public markets
Humphery-Jenner 2012	Fund size	Large PE funds yield lower returns Large PE funds earn lower returns if they invest in small companies
Kaplan & Schoar 2005	Fund inflows Persistence Market cyclicality	Large PE funds yield higher returns Top performing funds have better performance persistence Funds raised in boom times underperform
Kaplan & Sensoy 2015	Persistence	PE fund returns decline when more capital is committed
Kaplan & Strömberg 2009	Persistence	PE fund returns decline when more capital is committed
Ljungqvist et al. 2008	Credit markets Competition Persistence	Lower debt yield leads to more investment and higher returns Lower competition leads to higher returns Younger funds invest in riskier buyouts
Metrick & Yasuda 2010	Persistence	GPs use their experience by increasing the size of their funds leading to higher returns in later BO funds
Phalippou 2013	Fund size Market cyclicality	Buyout funds outperform public markets Relative performance is dependent on benchmark
Phalippou & Gottschalg 2009	Persistence	Buyout funds underperform public markets Inexperienced funds have lower performance
Phalippou & Zollo 2005	Market cyclicality	Fund performance varies positively with business and public market cycles
Robinson & Sensoy 2013	Compensation Ownership	GPs with higher fees generate higher fund performance

2.5 Synthesis of the literature review

Private equity is an asset class in which capital is invested in private companies through private equity funds that have several companies in their portfolio. The funds invest capital in companies with growth or other value creation potential in exchange for equity. In buyouts, the funds typically acquire the majority of the equity to gain control over the strategic decision making through the board of directors. Buyouts are the largest subgroup of private equity and especially secondary buyouts have grown in number among leveraged buyouts. The final performance of the private equity funds is dependent on choices made at every stage of the funds' lifecycle. However, the investment and exit decisions finally determine the success of individual deals and consequently the performance of the fund.

Research on deal-level performance of buyouts has provided evidence on differences between returns of deals exited via different ways. Credit market conditions are found to influence the exit choice and thus, affect the returns. Investments made under pressure are found to underperform. Also, the worse operational performance of the secondary buyouts compared to primary buyouts has raised questions about the motives of secondary buyouts. The critique is based on claimed limited operational value creation potential, the dependency of attractive debt markets and the overpricing of deals. The main motives for secondary buyouts are the facilitation of future fundraising, exploitation of different value creation strategies, exploitation of attractive debt and capital market conditions and faster realization of investments.

Several researchers have studied the deal-level returns of secondary buyouts but few research has been made on the effect of secondary buyouts on fund-level performance. Still, there is a lot of research on private equity fund performance on a more general level. The fund performance has found to be driven by the fund size, investor experience, holding time of deals, competition for deals, credit market conditions and public market cyclicality. Most of these affect the individual investment and exit decisions that consequently affect the fund performance. Especially credit market conditions and the time pressure are closely related to the decision of engaging in secondary buyouts.

2.6 Hypotheses

2.6.1 Secondary buyouts and fund performance

On the buying side, secondary buyout investments are found to underperform primary buyouts (Bonini 2015) at least when they are made under pressure to invest (Degeorge et al. 2016). SBOs are claimed to be primarily motivated by GP reputation boosting, exploitation of temporary economic conditions and reciprocity (Bonini 2015, Knauer 2014). Funds often engage in SBOs when they are investing under pressure and thus, they are sometimes called money burning devices and shown to create interest conflicts between GPs and LPs (Arcot et al. 2015). However, the previous results of the effect of SBO share of investments on fund performance by Arcot et al. (2015) provide a reason to expect a higher share of SBOs to result in higher fund performance.

H1: The more the fund's investments consist of SBO investments the better the fund performance

Researchers have found that the exit channel has an impact on the internal rate of return on equity of the selling PE firms (Achleitner et al. 2012). Achleitner et al. (2012) provides evidence that SBOs provide comparable returns to selling PE firms in comparison to exits via IPOs. However, in prior research secondary buyout exits are more often claimed to be distresses transactions, exit choice of last resort and found to be worse exit choices compared to IPOs and trade sales in terms of returns (Bonini 2015, Jelic & Wright 2011, Jenkinson & Sousa 2015). Due to the evidence on lower returns compared to other exit choices, the SBO exits can be assumed to negatively affect the fund performance

H2: The more the fund's exits consist of SBO exits the worse the fund performance

2.6.2 Fund size and share of secondary buyouts

Most researchers that have studied the effect of fund size on the fund performance have concluded larger funds outperform smaller ones (Higson & Stucke 2012, Kaplan & Schoar 2005, Phalippou & Gottschalg 2009). Usually larger funds are also more experienced and perform better since the funds' ability to raise new and larger funds is highly dependent on prior experience (Phalippou & Gottschalg 2009). Thus, better performing GPs raise larger funds. Larger funds have more sophisticated processes of screening, due diligence and valuation of the target companies and thus, they are more likely to make investments that lead to better performance (Gompers et al. 2016, Schmidt et al. 2010). Funds with better prior performance may also have better access to more leverage at better rates and thus, SBOs would create more value for larger funds.

Larger and more experienced funds usually also have more competence and skills to implement different strategies to exploit the more challenging value creation opportunities of secondary buyouts (Degeorge et al. 2016, Figge 2012). Jenkinson & Sousa (2015) show that the selling PE firms are smaller than the purchasing PE firms. This indicates that larger funds invest in companies that have already been developed by a smaller PE firm and thus, might still offer value creation potential. Thus, it can be assumed that when larger funds engage in SBOs they invest in better quality companies and are able to exploit their experience to create additional value.

H3: The larger the fund size the better the fund performance of funds with high share of SBO investments

Secondary buyouts are probably the quickest way to realize investments and funds that engage in SBOs might lack reputation and are willing to show returns to investors detriment to the performance (Arcot et al. 2015). As mentioned above, more experienced funds tend to sell to less experienced and thus, larger funds can be expected to have higher bargaining power to pricing of the deals. However, Figge et al. (2012) show that larger funds own larger companies and according to Achleitner et al. (2012) companies exited via IPO have higher enterprise value. As mentioned

above, Jenkinson & Sousa (2015) show that companies exited via IPO are sold by larger funds and thus, larger funds can be expected to underperform when they have higher share of SBO exits.

H4: The larger the fund size the worse the fund performance of funds with high share of SBO exits

2.6.3 Timing and share of secondary buyouts

On average, SBOs are made later in the investment period of the fund which may indicate that secondary buyouts are an alternative option when the buying side is under pressure but there are no tempting primary opportunities available (Arcot et al. 2015, Jenkinson & Sousa 2015). The funds that have a higher average buy pressure and engage in SBO investments tend to have a lower IRR over the life of the fund (Arcot et al. 2015). However, the funds engaging in SBOs earlier in their investment period are not penalized by the limited partners and are able to raise follow-on-funds of similar size as the funds not engaging in SBOs (Degeorge et al. 2016). Thus, the SBOs made later in the life of the fund can be expected to be made under pressure and underperform.

H5: The later the SBO investments are made into the life of the fund the worse the fund performance for funds with high SBO share of investments

SBOs offer an easier exit route for PE funds in comparison to IPOs and trades sales due to a quicker transaction process (Bonini 2015). At a later stage of the fund lifecycle, the pressure on PE firm to liquidate investments increases. Thus, it is likely that the PE firms engage in SBO exits when they are pressured to sell their portfolio companies (Wang 2012). Prior research has revealed that SBO exits made under pressure often lead to worse returns (Arcot et al. 2015, Figge 2012). Also on the fund level, the transaction returns decrease as the PE fund approaches the end of its lifespan and thus, affect the fund-level equity returns (Figge et al. 2012)

H6: The later the SBO exits are made into the life of the fund the worse the fund performance for funds with high SBO share of exits

2.6.4 Attractive debt markets and SBO investments

Lower credit spreads reflect better debt conditions for investors and are shown to have positive effects on the rate of investment and returns on investments (Ljungqvist et al. 2008, Phalippou & Zollo 2005). However, in some studies the attractive debt markets when cheap debt is available, are found to lead the buyouts to become more leveraged and the average returns to investments be lower (Axelson et al. 2013, Zhou et al. 2014). When there are no primary deals available but the credit conditions are attractive, funds engage in SBOs as an alternative investment option leading to a worse performance. Thus, the more funds have SBOs made during times when high-yield spreads are higher and investment decisions are more considered the higher their fund performance is.

H7: The higher the high-yield spread at the time of SBO investments the better the fund performance for funds with high SBO share of investments

In contrast, the selling side can benefit from the lower credit spreads when other PE firms are willing to acquire companies using high leverage and consequently often higher pricing providing a chance to exit their portfolio companies with higher valuation. Selling funds also engage more in SBOs when credit conditions are favorable (Wang 2012). Thus, funds that have a higher share of SBO exits during times of low credit spreads, benefit from the sellers' market and have higher fund performance.

H8: The lower the high-yield spread at the time of SBO exits the better the fund performance for funds with high SBO share of exits

3. Data and methods

3.1 Data

The empirical part of the thesis uses quantitative data to test and validate the hypotheses formed based on prior research on the topic. The research objectives are studied using regression analysis and models formed using variables discussed in the following section. The data for the analysis is gathered from Preqin, which is globally the leading source of data and intelligence service for the alternative assets industry. The data in Preqin is sourced via direct contacts to the leading professionals in the industry and is used by alternative assets professionals, researchers and the financial press. Preqin provides data and statistics from private equity, real estate, hedge funds, infrastructure, private debt, secondaries and natural resources. The data includes information about fundraising, performance, fund managers, institutional investors, deals and fund terms.

The data set is constructed using two databases of Preqin. First, all buyout funds with vintages from 2003 to 2010 are exported from the Fund Performance Analyst tool. The fund data set includes a total of 1554 funds that are filtered into 509 funds with performance information from 31st December 2016. The follow-up period until the end of 2016 was chosen the measure the performance of more mature funds which already have distributed capital back to the investors and thus, start showing their real performance (Phalippou & Gottschalg 2009). Secondly, all deals completed between the beginning of 2003 and the end of 2016 are exported from the Buyout Deals Analyst. The deals are then split into individual investments in cases of syndication leading to a total number of 49426 investments. These individual investments are cross-referenced with the 509 funds. After the cross-referencing, the final number of deals included in the study is 10261.

Using Microsoft Excel and Pivot functionality, the fund level information is aligned with the deal information to gather the share and volume of SBO investments and exits and other deal statistics. Out of the 509 funds, 22 funds without any relating deal are removed. This leaves a remaining sample size of 487 funds. The funds are

then further filtered to 447 funds with IRR information that is used to measure the fund performance in this study. The remaining 40 funds without IRR information are also included in the analysis using the Heckman correction to remove selection bias and thus, increase the validity of the study. The descriptive statistics of the sample are further discussed in section 4.1.

3.2 Variables

The variables used in the empirical analysis are presented in table 4. The variables are categorized into one dependent variable, 4 independent variables and 13 control variables out of which the moderating effects of 5 are studied.

Table 4: Variables used in regression analysis

Variable	*Variable type*	*Metric*	*Supportive literature*
Performance (Fund IRR)	Dependent	Continuous	(Arcot et al. 2015, Diller & Kaserer 2009, Harris et al. 2014, Kaplan & Schoar 2005)
SBO investment share of investments	Independent	0-1	
SBO investment share of investment volume	Independent	0-1	
SBO exit share of exits	Independent	0-1	
SBO exit share of exit volume	Independent	0-1	
Fund size	Control & Moderator	Logarithmic	(Harris et al. 2014, Higson & Stucke 2012, Humphery-Jenner 2012, Kaplan & Schoar 2005)
Timing of SBO investment*	Control & Moderator	Continuous	(Arcot et al. 2015, Ljungqvist & Richardson 2003)
Timing of SBO exits*	Control & Moderator	Continuous	(Arcot et al. 2015, Jenkinson & Sousa 2015, Ljungqvist & Richardson 2003)
HY spread at SBO investments*	Control & Moderator	Continuous	(Arcot et al. 2015, Hammer et al. 2017, Ljungqvist et al. 2008, Phalippou & Zollo 2005)
HY spread at SBO exits*	Control & Moderator	Continuous	(Arcot et al. 2015, Hammer et al. 2017, Ljungqvist et al. 2008)
IPO activity at SBO Investments	Control	Continuous	(Arcot et al. 2015)
IPO activity at SBO exits	Control	Continuous	(Arcot et al. 2015)

Industry specialization (HHI)	Control	Logarithmic	(Arcot et al. 2015, Humphery-Jenner 2012)
Geographical focus of the fund	Control	Categorical Variable	(Arcot et al. 2015, Hege et al. 2003, Phalippou & Gottschalg 2009)

*Notes: *also the variable based on average of all deals included in the models as control variables*

3.2.1 Dependent variable

Fund Performance (Net IRR)

Internal rate of return is widely used as a metric for fund performance measure in private equity research (Arcot et al. 2015, Harris et al. 2014, Kaplan & Schoar 2005). IRR is the best suited metric for the purpose of this thesis as it is dependent on both the value added and the time elapsed. In this thesis, the metric used for fund performance is the net IRR available in Preqin Fund Performance Analyst. The Net IRR is the internal rate of return for the limited partners net of management fees.

3.2.2 Independent variables

SBO investment share of Total investments

The SBO investments' share of total investments of the fund is used to study the relationship between the SBO investment activity and the fund performance. The SBO investment share of investments get values between 0 and 1 representing the share of the number of the SBO investments from all investments of the fund. The variable is constructed by matching buyout IDs in deal and exit data from Preqin Buyout Deals Analyst to track transactions between PE firms.

SBO investment share of Total investment volume

Similar to the SBO investment share of the total number of investment, the SBO investment share of investment volume is used to study the relationship between the SBO investment activity and the fund performance. The variable provides further information about the relationship taking into account the values of the deals and thus, the significance of the SBO investments for the performance of the fund.

SBO exit share of Total exits

The SBO exits' share of total exits of the fund is used to study the relation between the fund's decision to exit via SBO and the fund performance. The SBO exit share of exits get values between 0 and 1 representing the share of the number of the SBO exits from all exit of the fund. Similar to the SBO investments, the variable is constructed by matching portfolio company and transaction date in deal and exit data from Preqin Buyout Deals Analyst.

SBO exit share of Total exit volume

Again, similar to the SBO exit share of the total number of exit, the SBO exit share of exit volume is used to study the relationship between the SBO exits activity and the fund performance. The variable provides further information about the relationship taking into account the exit value of the portfolio companies and thus, the significance of the SBO exits for the performance of the fund.

3.2.3 Control variables

Fund size

Fund size has been shown to be a main driver of private equity fund performance in many previous studies. In most studies the correlation between fund size and performance is found to be positive (Higson & Stucke 2012, Phalippou & Gottschalg 2009) or concave (Kaplan & Schoar 2005, Robinson & Sensoy 2011). However, Humphery-Jenner (2012) show that there can also be a negative correlation between the fund size and returns. Because the fund size data is very skewed, the logarithm of the fund values are used to linearize the sample. The moderating effect of fund size is used in the analysis to study hypotheses 3 and 4.

Timing of investment

SBOs are often made later in the investment period of the fund indicating that there are no other alternatives available (Arcot et al. 2015, Jenkinson & Sousa 2015).

These funds that have a higher buy pressure and engage in SBO investments have lower fund performance (Arcot et al. 2015). However, the funds that invest in SBOs earlier are able to raise follow-on-funds of similar size as the funds not engaging in SBOs indicating better performance (Degeorge et al. 2016). Timing of SBO investments is calculated as average of time in years of SBO investments from the first investment made by the fund. The average time of all investments of the fund is also used as control variable.

Timing of exits

PE firms engage in SBO exits when they are pressured to sell their portfolio companies typically at the end of the life of the fund (Wang 2012). Prior research has also revealed that SBO exits made under pressure, and when the fund is approaching the end of its lifetime, lead to worse returns (Arcot et al. 2015, Figge 2012). The timing of SBO exits is calculated as average time in years of SBO exits from the first investment made by the fund. The average time of all exits of the fund is also used as control variable.

HY spread

High-yield credit spread (HY spread) is a proxy for the credit market conditions which are found to affect the performance of investments. The performance of the funds that invest when credits spreads or corporate bond yields are lower is found to better (Phalippou & Zollo 2005). Similar to Hammer et al. (2017) BofA Merrill Lynch US High Yield Option-Adjusted Spread is used as the proxy for credit market conditions regardless of the geographic focus of the fund. The average HY spread at SBO investments and average HY spread at SBO exits are both used as moderating variables as well as control variables. The average HY spread at all investments and average HY spread at all exits are used as control variables.

IPO market

The activity of IPO markets has been used as control variable in many studies (Arcot et al. 2015, Ljungqvist & Richardson 2003, Schmidt et al. 2010). The IPO activity is

used as a proxy to the capital market conditions that have effect on the likeliness of IPO exit. Arcot et al. (2015) used a dummy for cold IPO markets if the IPO volume of a period is less than average IPO volume. In this thesis, the IPO activity is calculated based on the buyout exit data from Preqin. The IPO activity per month is the IPO volume in bnEUR and the average IPO activity is then calculated for each fund.

Industry specialization (HHI)

Industries have different level of market risk and the dependency on macroeconomic conditions is different (Kaplan & Schoar 2005). Thus, the performance of two funds may be driven by totally different factors depending on the industry that the funds are focused on. PE funds usually follow a certain strategy which also includes the focus industries to benefit from industry-specific knowledge of operations and technology but they usually invest in several industries concentrating on average 40% of their investments in one industry (Arcot et al. 2015, Phalippou & Zollo 2005). However, diversification may reduce the returns of the fund by reducing the risk (Humphery-Jenner 2012). The industry specialization is calculated using modified Herfindahl-Hirschman index (HHI) to calculate the industry concentration of fund's investments. A higher HHI value indicates that fund is more specialized into a certain industry.

Geographical focus

Economies develop at different pace and the credit and equity conditions may vary between regions. Also, the PE industry is less mature in the developing countries but there are differences also between the US and Europe. Funds which focus on companies operating in European markets are found to perform worse than US-focused funds (Hege et al. 2003, Phalippou & Gottschalg 2009). Fund region focus is used as a dummy variable and the US is used as the benchmark region in the models.

3.3 Methods

3.3.1 Multiple linear regression

In this thesis, the hypotheses are tested using multiple linear regression. Linear regression is a statistical analysis method used for studying relationships between one dependent and one or several independent variables. Using linear regression, it is possible to explain the effects of independent variables on the dependent variable based on past observations, but linear regression can also be used to predict the future. The relationships are modeled using linear models, linear predictor functions whose parameters estimated from the data. Mathematically the linear models are usually of following form:

$$y = \beta_0 + \beta_1 x_1 + ... + \beta_n x_n + \varepsilon, \text{ where}$$

y = dependent variable
$x_1, \ldots, x_n$ = independent variables
β_0 = constant term
$\beta_1, \ldots, \beta_n$ = parameters of the independent variables
ε = error term

Using the ordinary least squares method, the parameters of the model are estimated based on the data by minimizing the sum of squares of the differences between the observed values of the dependent variable in the given dataset and the values predicted by the regression function using the parameters in question. This is one of the simplest and most common methods of linear regression analysis. The assumptions for the regression analysis include that firstly, the sample is representative of the population for the inference prediction. Secondly, the error has a mean of zero, a variance constant across the observations and the errors are uncorrelated. The constant variance also called homoscedasticity is analyzed in the analysis part of this thesis. Thirdly, the independent variables are measured without error and are mutually linearly independent.

3.3.2 Heckman correction method

Studies on private equity often suffer from selection bias which can be caused by lack of data of small buyouts and non-exited deals excluded from the sample (Valkama et al. 2013). The data available in Preqin is based on first-hand information gathered from the PE companies and companies may not be willing to share performance information of low-performing funds. The sample used in this thesis consists of funds that have reported their net internal rate of return and thus, the sample might not be perfectly random representation of the population. Heckman correction method is used to increase the reliability of the study by including the funds without informed IRR information and thus, removing the selection bias (Heckman 1979). The goal of the study is not to report the absolute performance of the funds but to evaluate the effect of SBO investments and exits on the performance and the relative performance across the funds. Therefore, the selection bias might not be an issue.

Despite the setting, Heckman correction method is still used to increase the validity of the study. The method is a two-step statistical approach which first estimates the probability that the performance of the fund is known and then estimates the linear regression model using the least squares method (Achleitner & Figge 2014). In this research, the vintage, the timing of exits and number of exited deals of the fund are used as the variables impacting the data availability. Less mature funds that exit their portfolio companies later and may have only few realized investments may be less likely to provide information about their performance. Due to the J-curve effect, the age of the fund is known to have effect on the realized returns and thus, more recent funds and funds with younger investments may hesitate to report their performance. In prior studies, larger funds are found to outperform smaller funds and thus, large funds may be overrepresented in the sample. The Heckman selection model is widely used in private equity research (Achleitner & Figge 2014, Gompers & Lerner 2000).

3.3.3 Testing moderation relationships

In this thesis, the moderating effect of fund size, timing of SBOs and HY spreads are used to test the hypotheses 3-8. To test the moderating effect, the interaction variables must be created by multiplying the two variables together (Fairchild & MacKinnon 2009). The linear regression with moderating effect can be mathematically expressed in the following way:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_1 x_2 + \varepsilon, \text{ where}$$

y = dependent variable
x_1, x_2 = independent variables
β_0 = constant term
β_1, β_2 = parameters of the independent variables
β_3 = parameter of the interaction term
ε = error term

3.3.4 Winsorization

To remove the possible effect of outliers on the results, winsorization is used to address the outliers in the model. Winsorization is a common method used in statistics that converts data above and beyond selected percentile to match the percentile. In this thesis, a winsorization of 1 % is used to remove some of the most extreme outliers.

4. Results

4.1 Descriptive analysis

4.1.1 Descriptive statistics

The final sample in this thesis consists of 447 funds that have up-to-date IRR information at the end of December 2016. The Heckman corrected sample includes the 40 funds without the IRR information forming an augmented sample of 487 funds. When studying the effect of SBO investments, the funds without any SBO investments are excluded from the sample whereupon the sample size is 278 funds and 316 funds with Heckman correction. Similarly, when studying the effect of SBO exits, excluding the funds that have no SBO exits, the remaining sample consists of 336 funds and 374 funds with Heckman correction.

The equal-weighted average IRR of the sample is 13.2% which is well in line with buyout fund sample IRR of 13.6% by Brown et al. (2015), 13.3% by Diller & Kaserer (2009) and 13.2% by Ewens et al. (2013). The value-weighted average IRR is 11.8% in comparison to 13.8% by Ewens et al. (2013). The median net IRR is 11.8% and the standard deviation is 16% while the smallest value is -32% and the largest value 240%. The mean of SBO share of total investments is 9% in number of deals and 10% in value of deals. For SBO share of exits the numbers are 26% and 19% respectively. From table 5 can be noticed that the volume data of funds is incomplete as the median values for both SBO share of investment volume and SBO share of exit volume are equal to zero whereas their corresponding shares of number of deals is close to the averages.

The average fund size is 1225 million euros (MEUR) but the data is really skewed as the median is only 487 MEUR and standard deviation 2105 MEUR. In comparison to the studies with equal IRRs, Brown et al. (2015) report a very close average fund size of 1324 MUSD (1180 MEUR on February 28th 2015) whereas Ewens et al. (2013) report an average of 1299 MUSD (981 MEUR on June 20th 2013) and Diller & Kaserer (2009) a much smaller average of 188 MEUR. The distribution of funds

by size is further illustrated in figure 8. The largest fund is as large as 15,936 MEUR while there are 2 funds that are 10 MEUR or less. Two funds do not have any size data.

Table 5: Sample statistics

	Mean	*Median*	*S.D.*	*Min*	*Max*	*N*
Net IRR	13.20	11.80	16.17	-31.90	239.80	447
SBO Share of Investments	0.09	0.06	0.11	0.00	1.00	487
SBO Share of Investment Volume	0.10	0.00	0.20	0.00	1.00	487
SBO Share of Exits	0.26	0.25	0.23	0.00	1.00	487
SBO Share of Exit Volume	0.19	0.00	0.30	0.00	1.00	487
Fund Size	1225	487	2105	9.8	15936	485
Timing of Investments	2.75	2.73	1.20	0.00	6.18	487
Timing of SBO Investments	2.54	2.36	1.58	0.00	9.42	300
Timing of Exits	5.91	5.99	1.33	1.98	9.55	469
Timing of SBO Exits	6.46	6.46	1.81	1.18	12.65	363
Holding Time	4.15	4.13	1.22	0.84	8.24	469
Holding Time of SBO Investments	2.78	2.68	2.14	0.00	9.62	300
Holding Time of SBO Exits	4.62	4.45	1.70	0.75	10.19	363
HY Spread at Investments	5.63	5.59	1.28	2.61	12.24	487
HY Spread at SBO Investments	5.42	5.17	2.29	2.57	16.73	300
HY Spread at Exits	5.61	5.45	0.92	3.70	12.86	469
HY Spread at SBO Exits	5.47	5.39	1.12	2.61	14.94	363
IPO Activity at Investments	2.46	2.44	0.84	0.39	6.73	487
IPO Activity at SBO Investments	2.56	2.32	1.95	0.00	11.88	300
IPO Activity at Exits	3.34	3.10	1.62	0.00	11.31	469
IPO Activity at SBO Exits	3.31	2.68	2.64	0.00	17.57	363
Industry Specialization	0.34	0.29	0.18	0.11	1.00	487
Region Focus: US	0.60	1.00	0.49	0.00	1.00	487
Region Focus: Europe	0.31	0.00	0.46	0.00	1.00	487
Region Focus: Asia	0.05	0.00	0.21	0.00	1.00	487
Region Focus: Australasia	0.03	0.00	0.17	0.00	1.00	487
Region Focus: Other	0.02	0.00	0.15	0.00	1.00	487

Table 6 presents the correlations between the variables used in the regression models. Correlations with an absolute value more than 0.13 are statistically significant at 5% level. Thus, 23% of the correlations are significant. As expected, the correlations are high between pairs such as timing of all exits and SBO exits (ρ=0.67) and timing of all investments and SBO investments (ρ=0.50). The correlation between timing of all exits and holding time is notable (ρ=0.77) even

though they can be expected to correlate but the high correlation implies that late exits are caused by prolonged holding period rather than late investments (ρ=-0.25).

The significant correlation between fund size and SBO share of exits (ρ=-0.38) is also interesting providing evidence that small funds are more likely to engage in SBOs as an exit route. Correspondingly, the correlation of fund size with SBO share of investments is small. Based on the correlation data, larger funds tend to invest at a later stage (ρ=0.32) and have more industry-diverse portfolios (ρ=-0.28). Regarding the macroeconomic conditions, the high-yield spread and IPO activity mainly correlate with the investment related factors. HY spread at time of SBO investments is positively correlated (ρ=0.23) with the timing of SBO investments implying that later SBO investments are made under less favorable credit market conditions.

Table 6: Statistics and correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1. Net IRR	1.00																										
2. SBO Share of Investments	0.05	1.00																									
3. SBO Share of Investment Volume	-0.01	0.48***	1.00																								
4. SBO Share of Exits	0.04	0.26***	0.15*	1.00																							
5. SBO Share of Exit Volume	0.01	0.14*	0.09	0.29***	1.00																						
6. Fund Size	-0.10	-0.11	0.11	-0.38***	0.10	1.00																					
7. Timing of Investments	-0.03	-0.24***	0.05	-0.05	-0.01	0.32***	1.00																				
8. Timing of SBO Investments	0.01	-0.12	-0.09	0.02	-0.03	0.01	0.50***	1.00																			
9. Timing of Exits	-0.12	-0.12	-0.05	-0.01	0.04	-0.09	0.16*	0.21***	1.00																		
10. Timing of SBO Exits	-0.14*	-0.21***	-0.18***	-0.10	-0.03	-0.08	0.07	0.18***	0.67***	1.00																	
11. Holding Time	-0.13	-0.07	-0.04	0.03	0.00	-0.17*	-0.25***	-0.22***	0.77***	0.55***	1.00																
12. Holding Time of SBO Investments	-0.05	-0.04	-0.01	-0.12	0.05	0.06	-0.23***	-0.43***	0.20***	0.19***	0.37***	1.00															
13. Holding Time of SBO Exits	-0.10	-0.13*	-0.09	-0.09	-0.05	-0.07	-0.20***	-0.21***	0.49***	0.75***	0.67***	0.30***	1.00														
14. HY Spread at Investments	-0.02	0.00	0.01	0.09	-0.11	-0.11	0.18*	0.28***	-0.05	-0.01	-0.23***	-0.15*	-0.20***	1.00													
15. HY Spread at SBO Investments	0.13*	-0.07	-0.10	0.10	-0.07	-0.21***	0.01	0.23***	0.00	0.01	-0.06	-0.04	-0.05	0.48***	1.00												
16. HY Spread at Exits	-0.12	-0.09	0.01	0.04	0.09	-0.10	-0.05	-0.13	0.03	-0.01	0.12	0.05	0.04	-0.11	0.04	1.00											
17. HY Spread at SBO Exits	-0.21***	-0.04	0.04	0.09	0.09	-0.11	-0.02	-0.08	-0.02	-0.00	0.03	-0.02	0.02	0.06	0.09	0.47***	1.00										
18. IPO Activity at Investments	-0.05	-0.01	-0.03	-0.03	-0.07	0.24***	0.18*	0.16*	-0.24***	-0.20***	-0.25***	-0.21***	-0.14*	-0.12	-0.03	-0.06	-0.07	1.00									
19. IPO Activity at SBO Investments	-0.12	0.08	0.05	-0.07	0.01	0.18***	-0.04	0.08	-0.05	0.00	-0.00	-0.19***	0.06	-0.12	-0.34***	-0.14*	-0.12	0.38***	1.00								
20. IPO Activity at Exits	0.01	0.10	0.05	0.05	-0.00	0.07	0.01	0.10	0.04	0.05	-0.02	-0.05	-0.00	0.13*	0.01	-0.40***	-0.23***	0.16*	0.10	1.00							
21. IPO Activity at SBO Exits	0.04	0.14*	0.03	0.13	0.08	-0.05	-0.10	0.05	0.01	0.09	0.02	-0.05	0.05	0.02	-0.04	-0.24***	-0.41***	0.09	0.08	0.55***	1.00						
22. Industry Specialization	0.07	0.04	-0.03	0.08	-0.12	-0.28***	-0.12	-0.04	0.02	-0.01	0.09	-0.01	0.04	-0.01	0.07	0.13	0.04	0.02	0.00	-0.07	0.07	1.00					
23. Region Focus: US	0.08	-0.22***	-0.14*	-0.05	-0.25***	0.01	0.27***	0.13*	-0.06	0.06	-0.09	-0.12	-0.03	0.06	-0.03	-0.02	0.04	-0.08	0.02	-0.11	-0.11	0.18***	1.00				
24. Region Focus: Europe	-0.07	0.26***	0.18*	0.10	0.30***	0.04	-0.23***	-0.11	0.07	-0.07	0.08	0.09	0.02	-0.10	-0.07	0.01	-0.08	0.04	0.03	0.14*	0.15*	-0.18***	-0.91***	1.00			
25. Region Focus: Asia	-0.08	-0.08	-0.05	-0.12	-0.03	0.02	-0.03	0.01	-0.01	0.07	-0.01	0.10	0.03	0.01	-0.03	0.02	0.10	0.12	0.00	-0.07	-0.07	-0.05	-0.17*	-0.11	1.00		
26. Region Focus: Australasia	0.04	-0.01	-0.03	-0.01	-0.09	-0.18*	-0.13	-0.11	-0.07	-0.12	0.00	-0.06	-0.04	0.13*	0.25***	0.01	0.08	-0.00	-0.14*	0.00	-0.05	0.03	-0.17*	-0.11	-0.02	1.00	
27. Region Focus: Other	-0.02	-0.05	-0.04	-0.03	-0.06	-0.03	-0.02	0.05	0.12	0.13	0.09	0.16*	0.10	-0.01	0.30***	0.02	-0.07	0.00	-0.09	-0.03	-0.01	0.03	-0.08	-0.05	-0.01	-0.01	1.00

*Notes: * p<0.05; ** p<0.01; *** p<0.001*

4.1.2 Sample characteristics

The fund size data is very skewed as can be seen in figure 8 with 52% of funds that are smaller than 500 MEUR and 28% are larger than 1000 MEUR with 5% larger than 5000 MEUR.

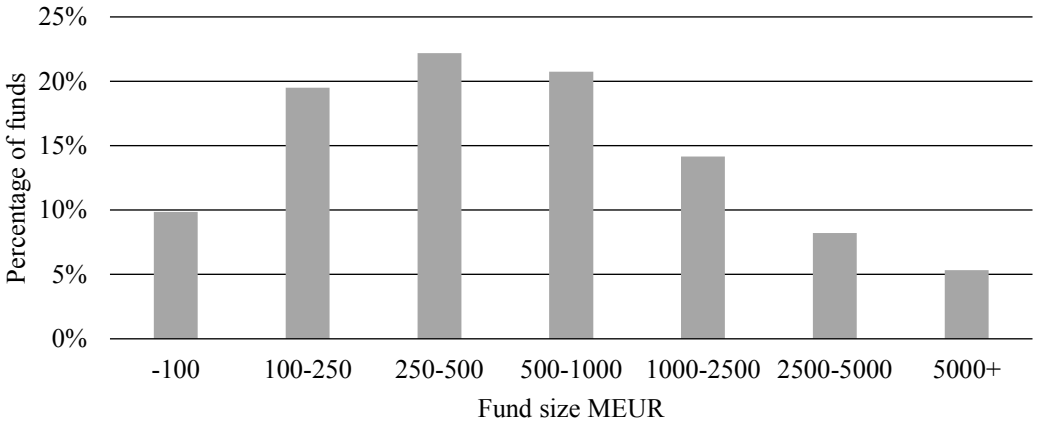

Figure 8: Distribution of funds by fund sizes

The distribution of funds by their vintage year reflects the trends in private equity industry in general. The distribution of funds is shown in figure 9. Funds with vintages 2005-2007 represent 55% of all funds whereas the following three vintage years 2008-2010 only represent 28% of the sample.

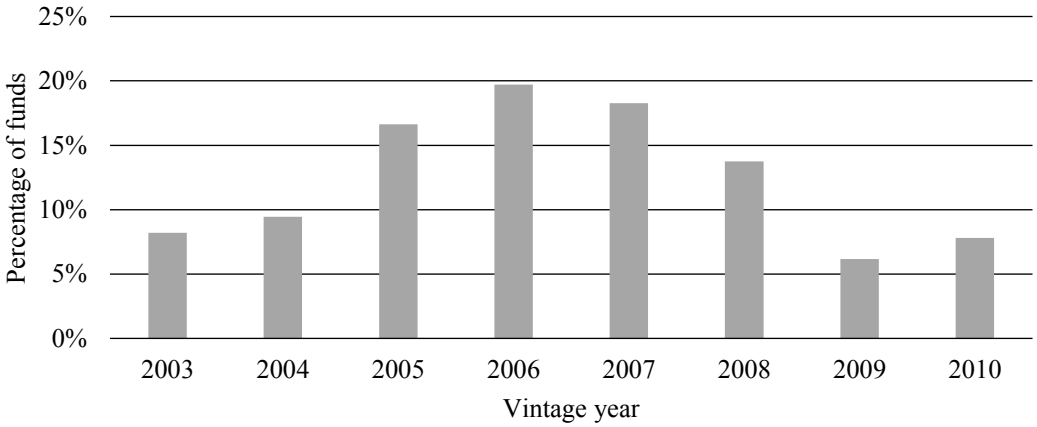

Figure 9: Number of funds by fund vintage years

From figure 10 can be noticed that the two largest geographical focus areas US & Canada and Europe represent over 90% of all funds with the shares of 60% and 31% respectively. Later in the results section Latin America, ME&I and Africa are combined due to their small individual share of deals.

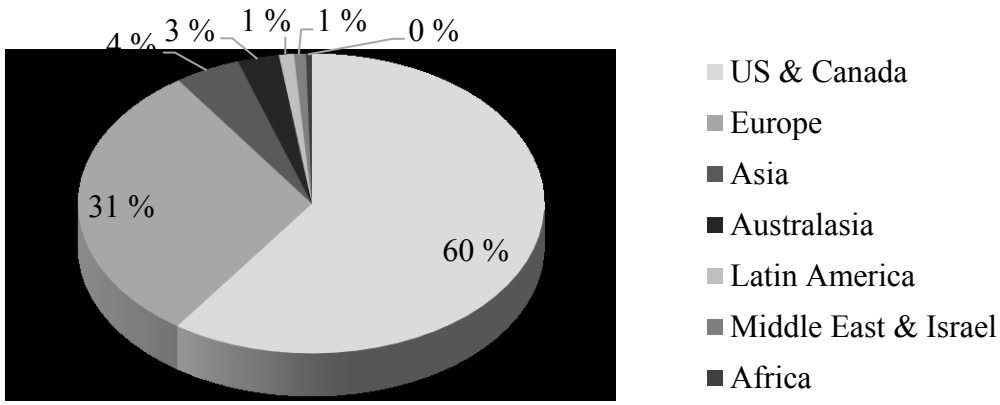

Figure 10: Share of funds by geographical focus

Figure 11 shows the number of investments done by investment type for each vintage year. The number of investments somewhat follows the distribution of funds by vintage year and has large variation between vintage years. Funds with vintage year 2006 have made 2360 investments whereas funds with vintage 2009 have only 576 completed deals.

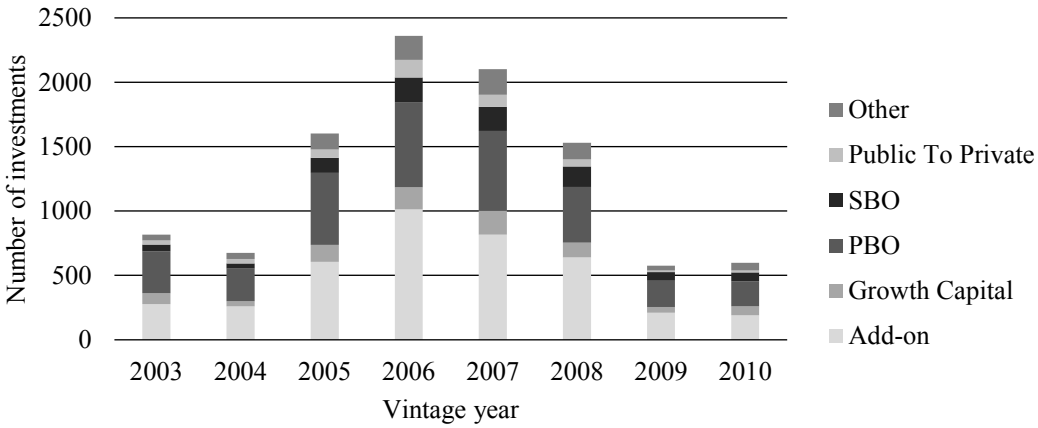

Figure 11: Number of investments by type per vintage year

Figure 12 shows the distribution of investment types per vintage years. Overall add-on investments represent nearly 40% of all investments while the shares of PBOs and SBOs are 32% and only 9% respectively. However, the SBO share of total investments has been increasing in years 2009 and 2010 with shares of 11% and 12% respectively.

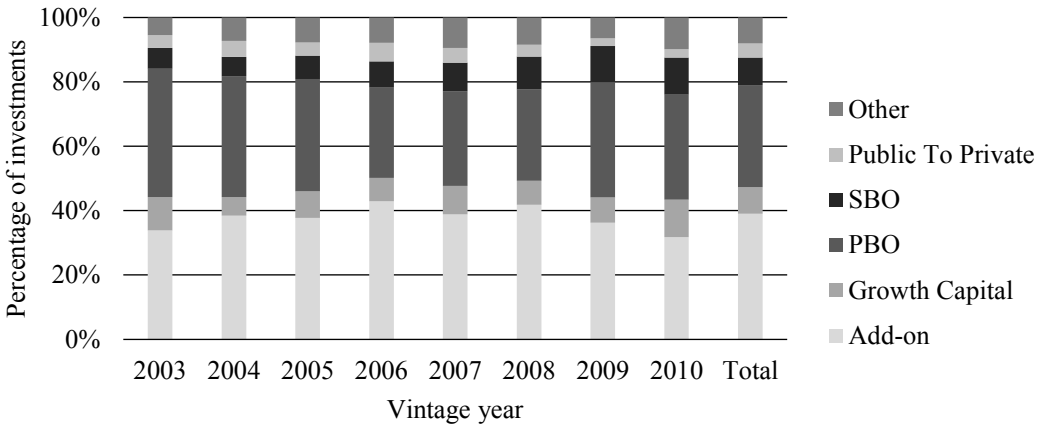

Figure 12: Distribution of investments by type per vintage year

The number of exits by type per vintage year are shown in figure 13. Naturally, the number of exits closely follows the distribution of number of investments. However, the younger funds have a larger share of investments that are not yet exited. The low exits per investments rate is partly due to a large share of add-on investments that mainly do not have a corresponding exit in the data set.

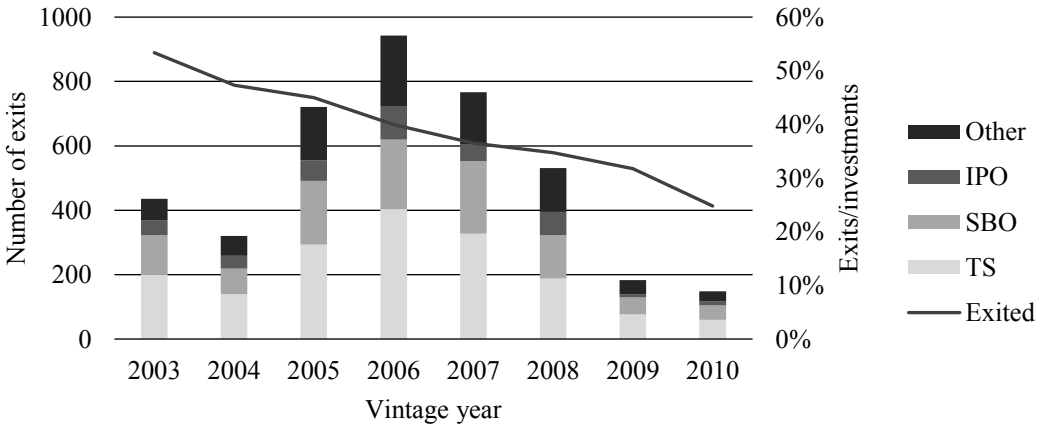

Figure 13: Number of exits by type per vintage year

Figure 14 shows the distribution of exited deals by exit route per vintage year. There is small variation between the vintage years especially in IPO exits. Overall, trade sales represent 42% of all deals whereas SBOs and IPOs represent 27% and 10% respectively.

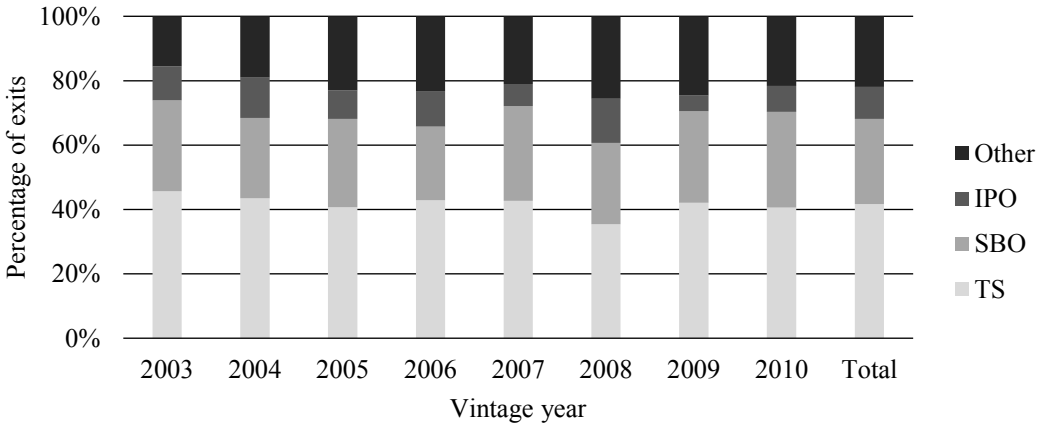

Figure 14: Distribution of exits by type per vintage year

Figure 15 shows the funds' IRRs plotted as function of funds' SBO share of investment. Out of the 487 funds, 187 funds do not have any SBO investment. Out of the 300 funds that have made at least one SBO investment, 238 funds have a SBO share of investments less than or equal to 20%. There is a very small correlation (ρ=0.05) between the net IRR and SBO share of investments.

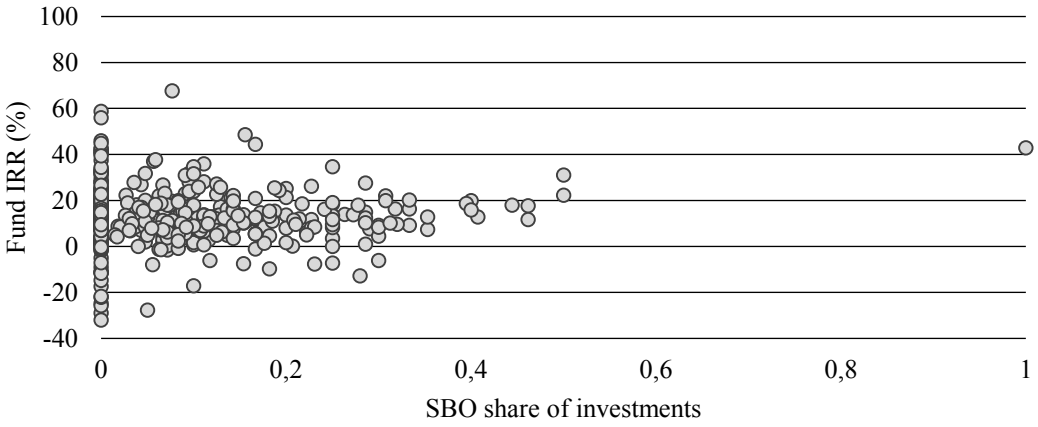

Figure 15: Fund IRR and SBO share of investments

Figure 16 shows the funds' IRRs plotted as function of funds' SBO share of exit. There are 124 funds that have not exited any of their deals via SBO. Out of the remaining 363 funds that have at least one SBO exit, only 50 funds have an SBO share of exits more than 50%. The correlation between net IRR and SBO share of exits is very weak (ρ=0.04).

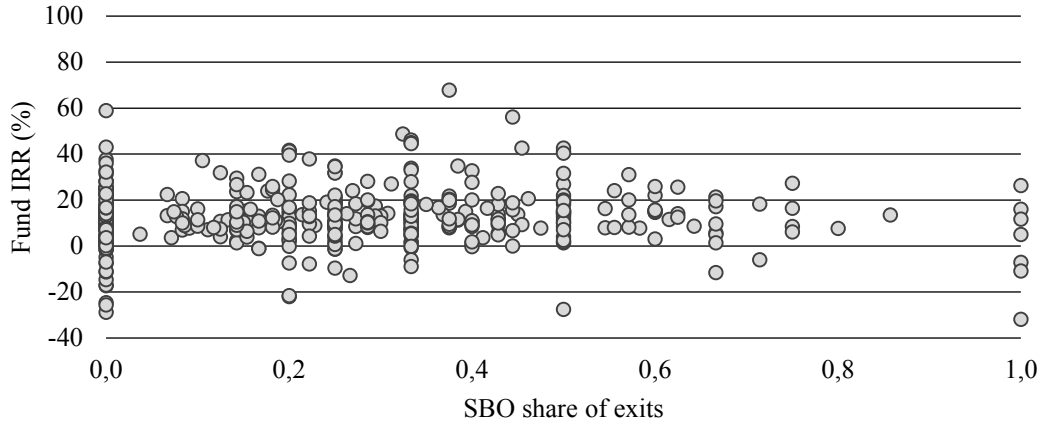

Figure 16: Fund IRR and SBO share of exits

In figure 17, with the fund net IRRs plotted as function of fund size, the skewness of the fund size data can be easily seen. The best and worst performing funds are among funds with revenue less than 1000 MEUR. There is no clear indication that the fund size would affect the fund performance but there is a weak negative correlation between the variables (ρ=-0.10).

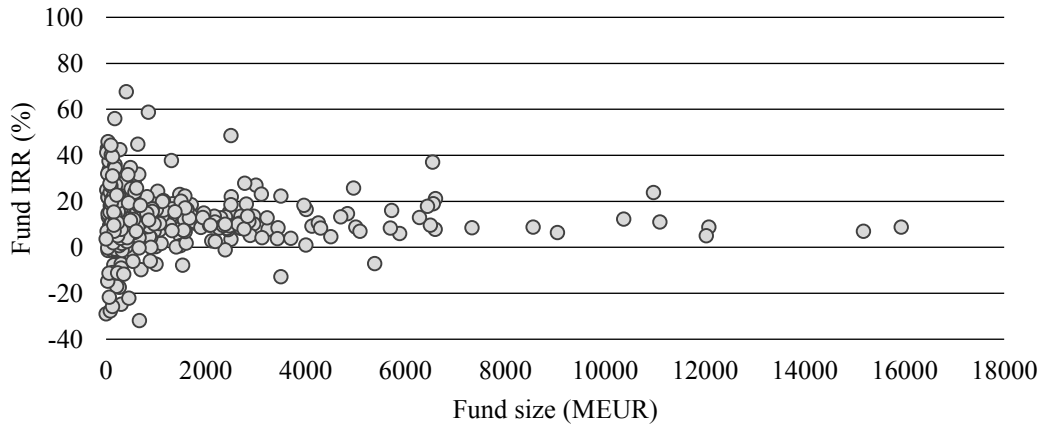

Figure 17: Fund IRR and fund size

Figure 18 shows how much after the fund's first investment the SBO investments are made on average and how it correlates with fund performance. Most of the funds make their SBO investment on average during the first four years.

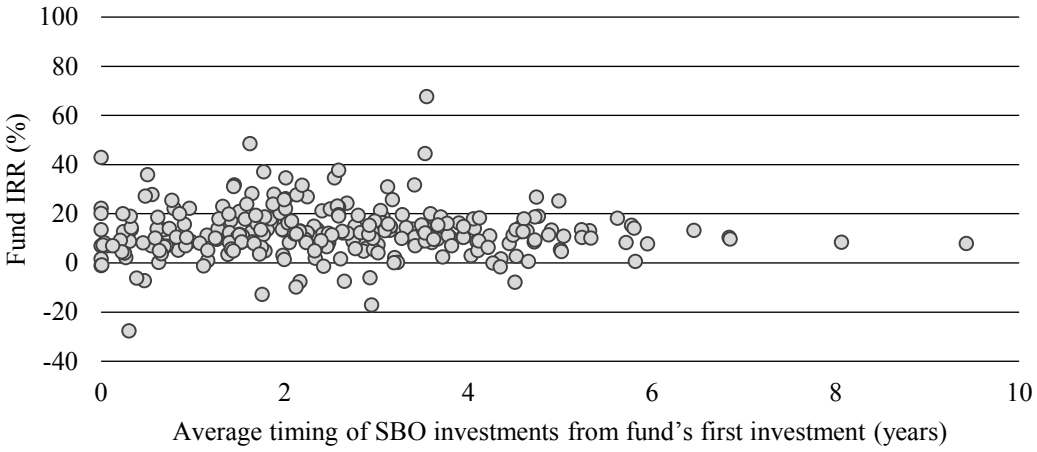

Figure 18: Fund IRR and timing of SBO investments

Figure 19 shows how much after the fund's first investment the SBO exits are made on average and how it correlates with fund performance. Most of the SBO exits are made on average between years five and eight.

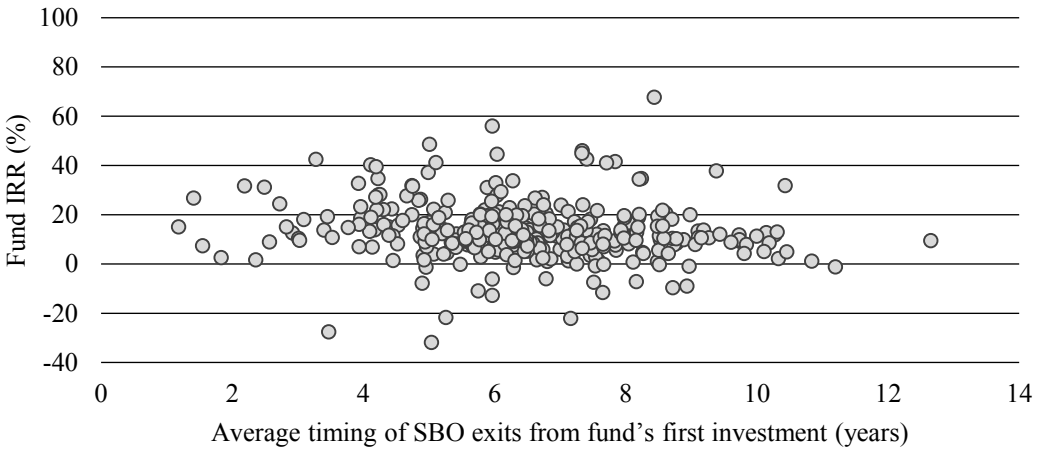

Figure 19: Fund IRR and timing of SBO exits

Figure 20 shows the relation between the average high-yield spread at the time of SBO investments and fund performance. Not much conclusions can be made based on the effect of credit spread but its correlation with net IRR is significant (ρ=0.13).

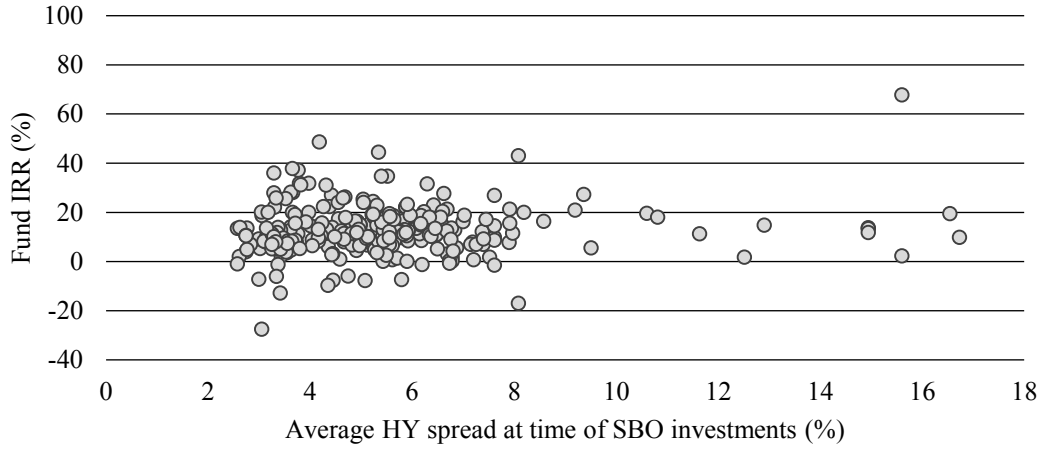

Figure 20: Fund IRR and HY spread at SBO investments

Figure 21 shows the relation between the average high-yield spread at the time of SBO exits and fund performance. Based on this figure and the correlation matrix it is possible to make an initial conclusion that higher HY spread is associated with lower fund performance (ρ=-0.21).

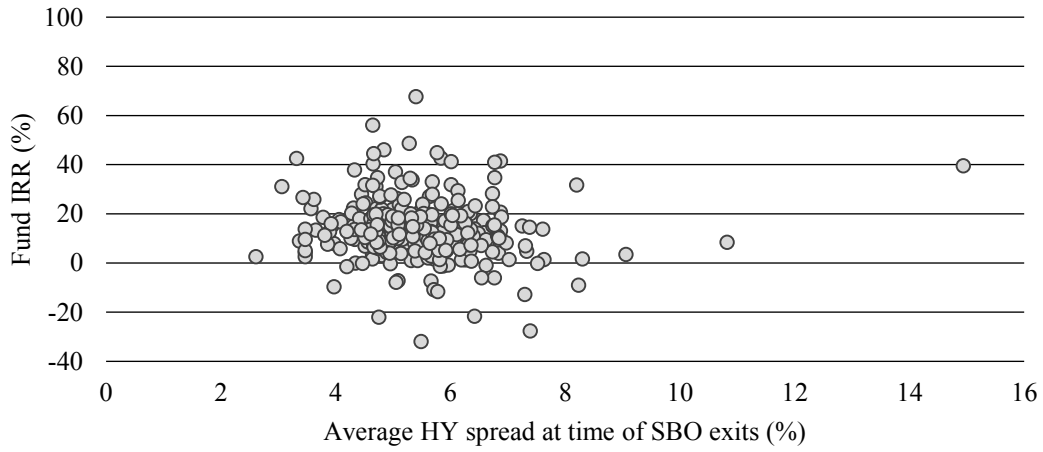

Figure 21: Fund IRR and HY spread at SBO exits

4.2 Regression analysis

4.2.1 Model of SBO investments, exits and fund performance

The results of the regression analysis can be found in table 7 and table 8. Models vary from the leftmost control model in table 7 to the rightmost full model in table 8. There are also models with different number of independent variables to better test the effect of the variables alone. To ascertain that the combination of variables used in the model are valid, tests for multicollinearity were done for all models.

Table 7: Regression models 1-7

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*
H1: SBO Share of Investments		*10.826**	*10.546**			*62.788****	
		(5.786)	*(6.045)*			*(12.537)*	
H2: SBO Share of Exits				*-4.572*	*-4.939*		*3.160*
				(3.521)	*(3.635)*		*(24.125)*
H3: SBO Share of Investments x Fund Size						*-20.147****	
						(4.509)	
H4: SBO Share of Exits x Fund Size							*-2.880*
							(8.509)
H5: SBO Share of Investments x Timing of SBO Investments (1)							
H6: SBO Share of Exits x Timing of SBO Exits (1)							
H7: SBO Share of Investments x Average HY Spread at SBO Investments							
H8: SBO Share of Exits x Average HY Spread at SBO Exits							
Log Fund Size (MEUR)	*-2.014*	*-0.281*	*-0.008*	*-4.801****	*-4.746****	*2.471*	*-3.960*
	(1.585)	*(1.416)*	*(1.483)*	*(1.423)*	*(1.457)*	*(1.624)*	*(2.618)*
Timing of SBO Investements (1)	*-0.144*	*0.329*	*0.355*			*0.418*	
	(0.494)	*(0.435)*	*(0.447)*			*(0.438)*	
Timing of SBO Exits (1)	*-1.087*			*-0.581*	*-0.622*		*-0.588*
	(0.690)			*(0.586)*	*(0.600)*		*(0.587)*
HY Spread at SBO Investments	*0.634*	*0.450*	*0.447*			*0.478*	
	(0.463)	*(0.428)*	*(0.433)*			*(0.421)*	
HY Spread at SBO Exits	*-2.322****			*-0.793*	*-0.869*		*-0.763*
	(0.791)			*(0.945)*	*(0.975)*		*(0.951)*
Timing of Investments (1)	*-0.296*	*-1.034*	*-0.989*			*-1.114*	
	(1.058)	*(0.813)*	*(0.823)*			*(0.796)*	
Timing of Exits (1)	*0.778*			*-1.091*	*-0.806*		*-1.037*
	(1.543)			*(1.050)*	*(1.057)*		*(1.048)*
Average Holding Time	*-2.069*	*-1.350**	*-1.279**	*-0.722*	*-0.763*	*-1.251**	*-0.755*
	(1.360)	*(0.725)*	*(0.742)*	*(0.957)*	*(0.975)*	*(0.724)*	*(0.966)*
Average Holding Time of SBO Investments	*-0.130*	*0.097*	*0.106*			*0.078*	
	(0.338)	*(0.295)*	*(0.301)*			*(0.295)*	
Average Holding Time of SBO Exits	*0.649*			*0.092*	*0.121*		*0.096*
	(0.632)			*(0.631)*	*(0.644)*		*(0.631)*
HY Spread at Investments	*-1.317*	*-1.136*	*-1.144*			*-1.297**	
	(0.858)	*(0.754)*	*(0.776)*			*(0.736)*	
HY Spread at Exits	*-0.745*			*-0.921*	*-0.822*		*-0.959*
	(1.069)			*(0.936)*	*(0.977)*		*(0.946)*
IPO Activity at Investments	*-0.957*	*-0.923*	*-0.938*			*-0.758*	
	(1.036)	*(0.956)*	*(0.990)*			*(0.935)*	
IPO Activity at SBO Investments	*-0.367*	*-0.278*	*-0.277*			*-0.279*	
	(0.324)	*(0.301)*	*(0.308)*			*(0.300)*	
IPO Activity at Exits	*-0.040*			*-0.600*	*-0.594*		*-0.610*
	(0.494)			*(0.562)*	*(0.580)*		*(0.570)*
IPO Activity at SBO Exits	*-0.125*			*-0.083*	*-0.090*		*-0.072*
	(0.297)			*(0.247)*	*(0.252)*		*(0.248)*
Industry Specialization (HHI)	*3.078*	*3.077*	*2.785*	*3.112*	*2.486*	*0.714*	*3.185*
	(4.007)	*(4.329)*	*(4.407)*	*(4.439)*	*(4.482)*	*(4.138)*	*(4.411)*
Region Focus: Europe	*-2.133**	*-2.040**	*-1.984*	*0.618*	*0.557*	*-1.711*	*0.698*
	(1.268)	*(1.188)*	*(1.228)*	*(1.310)*	*(1.314)*	*(1.186)*	*(1.361)*
Region Focus: Asia	*-2.708*	*-6.641****	*-6.683****	*-6.643***	*-6.588***	*-6.962*****	*-6.738***
	(2.360)	*(2.094)*	*(2.161)*	*(2.657)*	*(2.687)*	*(1.878)*	*(2.734)*
Region Focus: Australasia	*-1.775*	*3.434*	*3.477*	*2.168*	*2.418*	*3.586*	*2.348*
	(4.099)	*(4.376)*	*(4.537)*	*(4.297)*	*(4.490)*	*(4.399)*	*(4.292)*
Region Focus: Other	*-10.893**	*-8.538****	*-8.338****	*-2.873*	*-3.666*	*-8.808*****	*-2.859*
	(6.431)	*(2.640)*	*(2.676)*	*(14.311)*	*(14.582)*	*(2.541)*	*(14.098)*
Constant	*53.521*****	*27.040****	*25.076***	*53.083*****	*50.548*****	*20.200***	*50.584*****
	(12.109)	*(9.681)*	*(9.880)*	*(8.919)*	*(9.149)*	*(9.819)*	*(10.206)*
athrho	*-0.377*	*-0.439*		*-0.619***		*-0.335*	*-0.621***
	(0.266)	*(0.413)*		*(0.285)*		*(0.324)*	*(0.287)*
lnsigma	*2.181*****	*2.240*****		*2.405*****		*2.212*****	*2.405*****
	(0.088)	*(0.092)*		*(0.079)*		*(0.079)*	*(0.079)*
N	*279*	*316*	*278*	*374*	*336*	*316*	*374*
Inverse of Mills' ratio	*-3.186*	*-3.879*		*-6.100*		*-2.953*	*-6.119*
p-value	*0.156*	*0.287*		*0.030*		*0.300*	*0.030*

Notes:
*SE in parentheses clustered by GP; * p<0.1; ** p<0.05; *** p<0.01; **** p<0.001*
(1) Average time from first investment made by fund

Table 8: Regression models 8-14

	Model 8	*Model 9*	*Model 10*	*Model 11*	*Model 12*	*Model 13*	*Model 14*
H1: SBO Share of Investments	*18.406***		*-12.218*		*83.416***		*76.179**
	(8.755)		*(18.757)*		*(40.010)*		*(43.614)*
H2: SBO Share of Exits		*-3.408*		*43.652**		*53.162*	*0.968*
		(16.230)		*(24.838)*		*(34.983)*	*(32.952)*
H3: SBO Share of Investments x Fund Size					*-24.287****		*-28.324***
					(8.436)		*(12.522)*
H4: SBO Share of Exits x Fund Size						*-4.353*	*4.387*
						(8.789)	*(8.149)*
H5: SBO Share of Investments x Timing of SBO Investments (1)	*-3.988*				*1.225*		*2.028*
	(2.955)				*(3.164)*		*(4.110)*
H6: SBO Share of Exits x Timing of SBO Exits (1)		*-0.190*				*0.775*	*0.601*
		(2.478)				*(2.744)*	*(2.630)*
H7: SBO Share of Investments x Average HY Spread at SBO Investments			*4.031*		*-2.153*		*0.685*
			(3.032)		*(3.739)*		*(3.737)*
H8: SBO Share of Exits x Average HY Spread at SBO Exits				*-8.857**		*-9.331**	*-2.746*
				(4.583)		*(4.805)*	*(5.455)*
Log Fund Size (MEUR)	*-0.407*	*-4.802****	*-0.301*	*-4.595****	*3.078*	*-3.311*	*0.723*
	(1.423)	*(1.424)*	*(1.411)*	*(1.419)*	*(2.035)*	*(2.686)*	*(2.928)*
Timing of SBO Investements (1)	*0.657*		*0.350*		*0.324*		*-0.234*
	(0.467)		*(0.434)*		*(0.434)*		*(0.522)*
Timing of SBO Exits (1)		*-0.535*		*-0.508*		*-0.702*	*-1.161*
		(0.735)		*(0.589)*		*(0.773)*	*(0.871)*
HY Spread at SBO Investments	*0.464*		*0.084*		*0.675*		*0.564*
	(0.425)		*(0.484)*		*(0.533)*		*(0.566)*
HY Spread at SBO Exits		*-0.790*		*1.649*		*1.815*	*-1.304*
		(0.946)		*(1.551)*		*(1.576)*	*(1.717)*
Timing of Investments (1)	*-0.826*		*-1.032*		*-1.197*		*-0.513*
	(0.855)		*(0.801)*		*(0.857)*		*(1.085)*
Timing of Exits (1)		*-1.072*		*-1.090*		*-1.089*	*0.785*
		(1.049)		*(1.028)*		*(1.033)*	*(1.489)*
Average Holding Time	*-1.353**	*-0.723*	*-1.313**	*-0.716*	*-1.252**	*-0.763*	*-2.070*
	(0.728)	*(0.957)*	*(0.726)*	*(0.951)*	*(0.717)*	*(0.959)*	*(1.419)*
Average Holding Time of SBO Investments	*0.084*		*0.131*		*0.059*		*-0.108*
	(0.297)		*(0.295)*		*(0.300)*		*(0.351)*
Average Holding Time of SBO Exits		*0.094*		*0.025*		*0.020*	*0.642*
		(0.633)		*(0.632)*		*(0.637)*	*(0.623)*
HY Spread at Investments	*-1.145*		*-1.357**		*-1.211*		*-1.335*
	(0.755)		*(0.788)*		*(0.780)*		*(0.885)*
HY Spread at Exits		*-0.923*		*-0.585*		*-0.614*	*-0.640*
		(0.942)		*(0.942)*		*(0.962)*	*(1.139)*
IPO Activity at Investments	*-0.859*		*-0.892*		*-0.759*		*-0.911*
	(0.959)		*(0.945)*		*(0.936)*		*(1.023)*
IPO Activity at SBO Investments	*-0.252*		*-0.258*		*-0.298*		*-0.397*
	(0.300)		*(0.302)*		*(0.301)*		*(0.321)*
IPO Activity at Exits		*-0.603*		*-0.814*		*-0.829*	*-0.115*
		(0.570)		*(0.565)*		*(0.576)*	*(0.506)*
IPO Activity at SBO Exits		*-0.083*		*-0.093*		*-0.077*	*-0.173*
		(0.247)		*(0.240)*		*(0.242)*	*(0.296)*
Industry Specialization (HHI)	*2.126*	*3.074*	*2.031*	*3.676*	*1.072*	*3.977*	*2.673*
	(4.174)	*(4.505)*	*(4.334)*	*(4.407)*	*(4.056)*	*(4.451)*	*(4.033)*
Region Focus: Europe	*-2.137**	*0.616*	*-1.982**	*0.697*	*-1.647*	*0.833*	*-1.884*
	(1.184)	*(1.309)*	*(1.190)*	*(1.298)*	*(1.190)*	*(1.366)*	*(1.347)*
Region Focus: Asia	*-6.651****	*-6.648***	*-6.737****	*-6.338***	*-6.978*****	*-6.448***	*-3.009*
	(1.960)	*(2.664)*	*(2.115)*	*(2.752)*	*(1.870)*	*(2.831)*	*(2.305)*
Region Focus: Australasia	*3.446*	*2.161*	*3.011*	*2.307*	*3.840*	*2.613*	*-1.821*
	(4.335)	*(4.302)*	*(4.419)*	*(4.242)*	*(4.500)*	*(4.238)*	*(4.342)*
Region Focus: Other	*-8.441****	*-2.896*	*-7.348****	*-1.790*	*-9.530*****	*-1.606*	*-9.981*
	(2.571)	*(14.353)*	*(2.624)*	*(14.770)*	*(2.702)*	*(14.253)*	*(6.394)*
Constant	*26.325****	*52.709*****	*30.320****	*37.758****	*17.327*	*34.708***	*40.395***
	(9.798)	*(9.147)*	*(10.351)*	*(13.240)*	*(11.976)*	*(13.744)*	*(19.101)*
athrho	*-0.437*	*-0.619***	*-0.402*	*-0.636***	*-0.344*	*-0.644***	*-0.352*
	(0.388)	*(0.285)*	*(0.388)*	*(0.275)*	*(0.327)*	*(0.280)*	*(0.233)*
lnsigma	*2.237*****	*2.405*****	*2.232*****	*2.400*****	*2.212*****	*2.400*****	*2.166*****
	(0.090)	*(0.079)*	*(0.088)*	*(0.076)*	*(0.079)*	*(0.076)*	*(0.083)*
N	*316*	*374*	*316*	*374*	*316*	*374*	*279*
Inverse of Mills' ratio	*-3.848*	*-6.104*	*-3.557*	*-6.193*	*-3.023*	*-6.252*	*-2.950*
p-value	*0.261*	*0.030*	*0.299*	*0.021*	*0.292*	*0.021*	*0.131*

Notes:
*SE in parentheses clustered by GP; * p<0.1; ** p<0.05; *** p<0.01; **** p<0.001*
(1) Average time from first investment made by fund

Model 1: Heckman corrected sample: control variables

The first model consists only of control variables using the Heckman selection method. The high-yield spread at time of SBO exits has a statistically significant negative effect on fund performance at 1% level implying that SBO exits in unfavorable debt market conditions, i.e. when credit spread is high, negatively affect fund performance. Also, the funds that are focused on Europe perform slightly worse and funds focused on Latin America, Middle East and Africa significantly worse than funds focused on US & Canada at 10% significance level.

Model 2: Heckman corrected sample: SBO share of investments

The second model includes the SBO share of fund's total investments as independent variable without the variables controlling for SBO exits. A higher SBO share positively affects the fund's IRR at 10% significance level providing evidence supporting the hypothesis 1. The holding time has negative effect on fund performance at 10% significance level which is intuitive when thinking about the mathematical formulation of IRR. Geographical focus dummies are again mostly significant at different levels.

Model 3: Non-corrected sample: SBO share of investments

The third model is similar to the second except for the sample. Model 3 uses only the funds with available IRR data. The results are in line with the second model apart from some small significance differences.

Model 4: Heckman corrected sample: SBO share of exits

The fourth model is similar to the second model with the exception that it includes the SBO share of exits and variables controlling for SBO exit related factors and excludes the SBO share of investments and control variables of SBO investments. The higher SBO share of fund's exits has a small negative yet insignificant effect on the fund performance. The size of the fund has a negative effect on the fund

performance at 0.1% significance level which contradicts with most of the findings of previous research.

Model 5: Non-corrected sample: SBO share of exits

Also for the SBO share of exits, the results are very similar with the sample including only the funds with IRR information.

Model 6: Heckman corrected sample: SBO share of investments with fund size moderator

The sixth model features the SBO share of investments with the moderating effect of the fund size. In this model, the SBO share has a very strong positive and significant effect on the fund performance at 0.1% significance level. The negative moderating effect of fund size is also significant at 0.1% level which strongly implies that larger funds with higher SBO share perform worse than smaller funds providing opposite support for hypothesis 3.

Model 7: Heckman corrected sample: SBO share of exits with fund size moderator

The seventh model is an extension of model 4 with the added moderating effect of fund size. In this model there barely any statistical significance. The SBO share of exits has a small positive coefficient but the standard error is very high to make any conclusions. Thus, there is no support for the hypothesis 4.

Model 8: Heckman corrected sample: SBO share of investments with SBO investment timing moderator

The eight model is similar to the sixth model but with the moderating effect of the average time of the SBO investments instead of the fund size. The effect of SBO share of investments is positive and significant at 5% level. The moderating effect is negative yet insignificant but still provides weak support for the hypothesis 5. The control variable timing of SBO investments is negative and small but insignificant

and thus, there is no clear evidence that the size of the fund would have effect on the fund performance.

Model 9: Heckman corrected sample: SBO share of exits with SBO exit timing moderator

The ninth model features the SBO share of exits and the average timing of the SBO exits. As in fourth model, the SBO share of exits has a negative yet insignificant effect on fund performance. The moderating effect is close to zero indicating not much moderating effect of the timing of SBO exits and thus, does not provides any support for the hypothesis 6. The individual control variable of SBO exit timing indicates small negative yet insignificant effect of later SBO exits implying that the time of exit is not a strong driver of fund performance. The effect of fund size is significant at 0.1% level with a negative effect on fund performance.

Model 10: Heckman corrected sample: SBO share of investments with high-yield spread at the time of SBO investment moderator

The 10th model features the SBO share of investments with the moderating effect of the average high-yield spread at the time of SBO investments. Unlike in any previous model, the effect of SBO share has a negative effect on fund performance but the coefficient is far from being statistically significant. The HY spread of SBO investments is negative at 10% significance level while the moderating effect is weakly positive implying that higher SBO share in unattractive credit markets lead to higher fund performance. However, there is no statistical significance for the moderation and thus, there is not enough support for the hypothesis 7.

Model 11: Heckman corrected sample: SBO share of exits with high-yield spread at the time of SBO exits moderator

In the 11th model the SBO share of exits is moderated by the HY spread at the time of SBO exits. The effect of SBO share is strongly positive and significant at 10% level. Also, the moderating effect is significant at 10% level and has a negative effect

on fund performance. This provides support for the hypothesis 8. Again, the fund size has a negative effect on fund performance at 1% significance level.

Model 12: Heckman corrected sample: SBO share of investments with moderators

The 12th model features all the moderating effects of fund size, average timing of SBO investments and average HY spread at the time of investments. The SBO share of investments has a strong positive effect on fund performance at 5% significance level whereas similar to model 6, the moderating effect of fund size is negative and significant at the 1% level. This provides more support for the hypothesis 3. The two other moderating effects are small with high standard errors and thus, they do not provide any support for hypotheses 5 and 7.

Model 13: Heckman corrected sample: SBO share of exits with moderators

The 13th model features the SBO share of all exits and the moderating effects of fund size, timing of SBO exits and the HY spread at the time of exit. The moderating effect of HY spread with the SBO share is negative and significant at 10% level. This implies that SBO exits made when HY spread is high negatively affect the fund performance providing support for hypothesis 8. The effect of SBO share of exits is highly positive but has high standard error and thus, is not statistically significant. The moderating effects of fund size and timing of SBO exits are small and insignificant which gives no support for hypotheses 4 and 6.

Model 14: Heckman corrected sample: Full model – SBO share of investments and exits with moderators

The full model shows that the SBO share of investments has a strong positive effect on fund performance at 10% significance level which is in line with the model 2 and thus, the hypothesis 1 is strongly supported. The effect can be seen from figure 22 that has the fund net IRR plotted as function of SBO share of investments with fitted linear estimate.

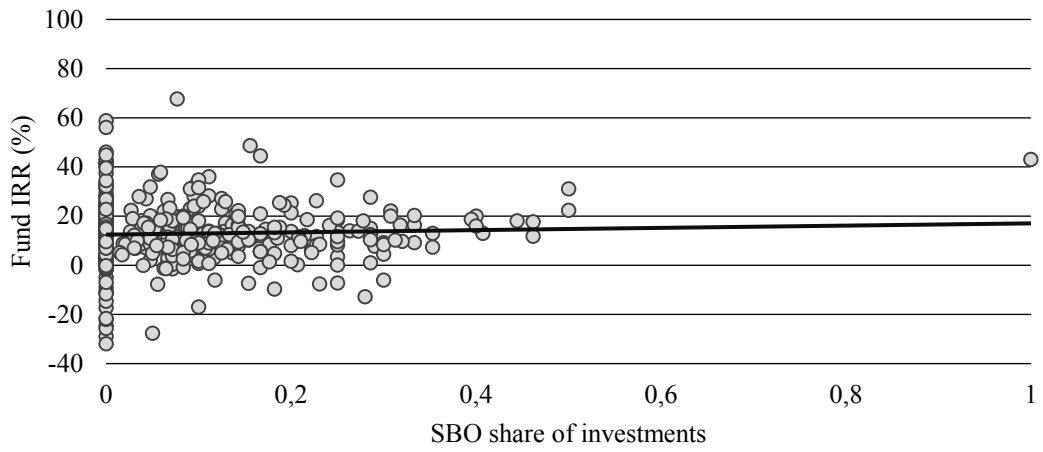

Figure 22: Fund IRR and SBO share of investments with fitted line

The moderating effect of fund size with SBO share of investments is negative and statistically significant at 5% level. As can be seen if figure 23, the fund performance of funds with size over the 3rd quartile is lower with higher SBO share of investments. The fund performance is also significantly higher for funds smaller than the 1st quartile which is 122 MEUR. For these smaller funds the fund performance is distinctly higher with higher SBO share of investment. Thus, there is clear support for the opposite of hypothesis 3.

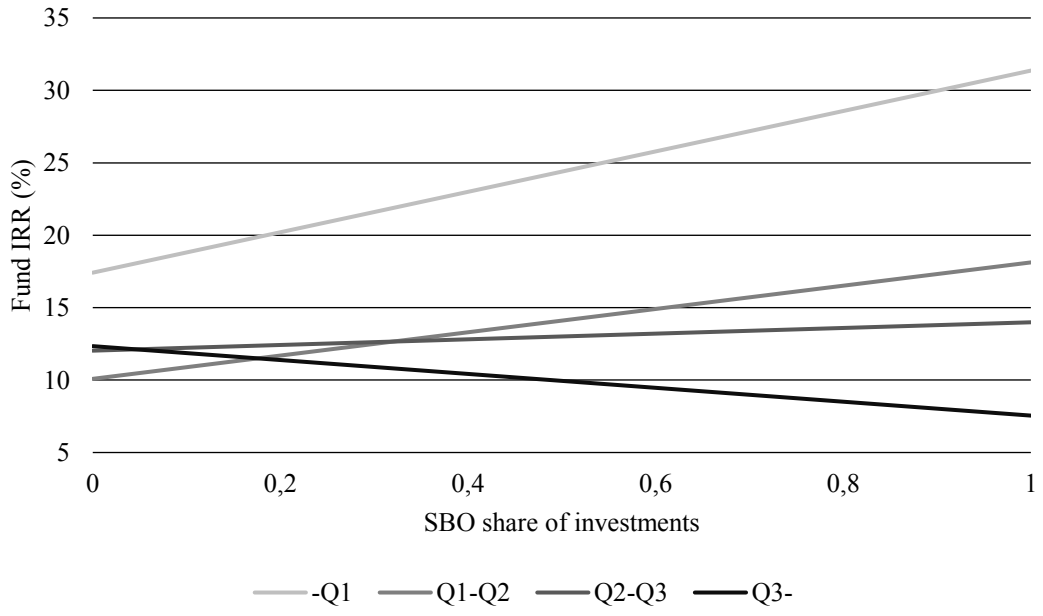

Figure 23: Moderating effect of fund size on fund performance

In this model, the effect of SBO share of exits is close to zero with a high standard error and thus, is insignificant. Therefore, the hypothesis 2 does not hold but there is no clear support for the opposite either. Looking at the figure 24 the relation between the SBO share of exits and fund performance actually looks concave.

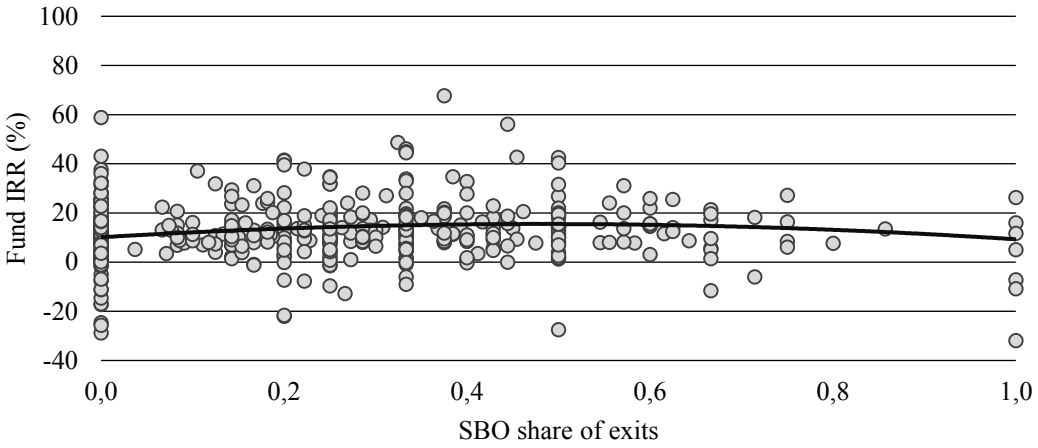

Figure 24: Fund IRR and SBO share of exits with fitted line

The results of models 11 and 13 provide some support for the hypothesis 8 but the full model 14 does not have any statistical for the moderating effect of the HY spread at time of SBO exits. As can be seen in Figure 25 the moderating effect is not linear. The funds that have made a higher share of SBO exits when HY spreads are over 6.1% on average clearly outperform funds that have not exploited the opportunity. However, the results are completely opposite for funds that have a higher share of SBO exits when HY spreads are between 5.4% and 6.1% on average. When the SBO exits are made during times of lower HY spreads, the funds with higher SBO share of exits slightly outperform. Thus, there is partial support for hypothesis 8.

The other moderating effects have no statistical significance and thus, there is no clear support for the hypotheses 4-7.

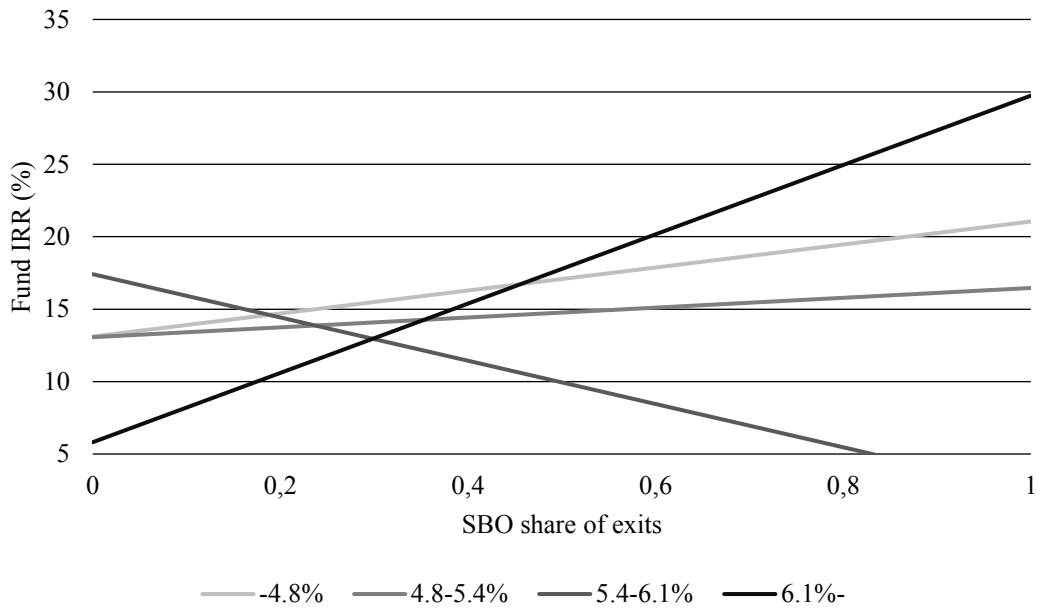

Figure 25: Moderating effect of HY spread on fund performance

4.2.2 Regression models testing internal validity

Due to the incompleteness of the data for deal values, the SBO share of investment and exit volumes are not used in the main analysis. However, the variables are used to test the internal validity of the research. Control variable model, IV-models, full model and the models that had statistically significant moderating effects are presented in table 9 using the SBO share of investment and exit volumes in place of SBO shares of number of investments and exits. The model numbering is in line with the models in main analysis.

The results are well in line with results of the main analysis presented in table 7 and table 8. In the IV-models 2a and 3a, the magnitude of the coefficients is slightly lower due to the incomplete data and thus, biased sample. Model 6a provides identical support for hypothesis 3 at 1% significance level as model 6 in the main analysis which was significant at 0.1% level. In contrast to the main analysis, model 8a gives support for hypothesis 5 while model 8 did not provide statistically significant support for the hypothesis.

Model 12a that has all moderating effects for SBO share of investment volume has somewhat similar coefficients for the SBO share and fund size moderation but additionally has statistical significance for moderating effect of timing of SBO investments providing support for hypothesis 5. In model 13a with SBO share of exit volume and moderating effects only the SBO share has statistical significance whereas in model 13 in main analysis, only the moderating effect of HY spread had a statistically significant effect. There is no statistical significance in the full model. Overall, none of the models provide any evidence contradictory to the results of the main analysis.

Table 9: Regression models 15-22

	Model 1a	Model 2a	Model 4a	Model 6a	Model 8a	Model 12a	Model 13a	Model 14a
H1: SBO Volume of Investments		3.237		34.726***	8.846*	24.123*		6.358
		(2.122)		(10.767)	(4.582)	(14.241)		(14.977)
H2: SBO Volume of Exits			2.485				38.040**	12.542
			(2.172)				(16.910)	(23.040)
H3: SBO Volume of Investments x Fund Size				-11.362***		-8.862**		-1.758
				(3.760)		(3.756)		(4.924)
H4: SBO Volume of Exits x Fund Size							-5.232	0.297
							(3.809)	(5.498)
H5: SBO Volume of Investments x Timing of SBO Investments (1)					-2.403*	-2.260**		-2.154
					(1.384)	(1.099)		(1.638)
H6: SBO Volume of Exits x Timing of SBO Exits (1)							-1.107	-1.234
							(1.314)	(1.788)
H7: SBO Volume of Investments x Average HY Spread at SBO Investments						1.671		0.829
						(1.295)		(1.437)
H8: SBO Volume of Exits x Average HY Spread at SBO Exits							-2.636	-0.542
							(1.733)	(1.868)
Log Fund Size (MEUR)	-2.014	-0.533	-4.502****	1.289	-0.593	0.898	-2.962*	-1.879
	(1.585)	(1.409)	(1.344)	(1.651)	(1.404)	(1.681)	(1.622)	(2.246)
Timing of SBO Investements (1)	-0.144	0.356		0.372	0.656	0.678		0.124
	(0.494)	(0.445)		(0.444)	(0.493)	(0.474)		(0.535)
Timing of SBO Exits (1)	-1.087		-0.512				-0.214	-0.969
	(0.690)		(0.587)				(0.659)	(0.773)
HY Spread at SBO Investments	0.634	0.426		0.428	0.441	0.321		0.601
	(0.463)	(0.426)		(0.420)	(0.423)	(0.462)		(0.543)
HY Spread at SBO Exits	-2.322***		-0.799				-0.130	-2.211*
	(0.791)		(0.977)				(1.160)	(1.162)
Timing of Investments (1)	-0.296	-1.359*		-1.264*	-1.255	-1.188		-0.271
	(1.058)	(0.810)		(0.768)	(0.798)	(0.768)		(1.066)
Timing of Exits (1)	0.778		-1.109				-1.281	0.846
	(1.543)		(1.073)				(1.080)	(1.526)
Average Holding Time	-2.069	-1.490**	-0.828	-1.511**	-1.511**	-1.455**	-0.469	-1.980
	(1.360)	(0.714)	(0.966)	(0.705)	(0.707)	(0.692)	(0.976)	(1.378)
Average Holding Time of SBO Investments	-0.130	0.085		0.087	0.094	0.120		-0.136
	(0.338)	(0.297)		(0.299)	(0.301)	(0.298)		(0.331)
Average Holding Time of SBO Exits	0.649		0.162				0.036	0.666
	(0.632)		(0.617)				(0.643)	(0.656)
HY Spread at Investments	-1.317	-1.057		-1.046	-1.033	-1.192		-1.278
	(0.858)	(0.774)		(0.755)	(0.769)	(0.770)		(0.875)
HY Spread at Exits	-0.745		-1.096				-1.133	-0.871
	(1.069)		(0.926)				(0.921)	(1.064)
IPO Activity at Investments	-0.957	-0.963		-0.808	-1.012	-0.870		-0.995
	(1.036)	(0.962)		(0.949)	(0.956)	(0.948)		(1.097)
IPO Activity at SBO Investments	-0.367	-0.260		-0.272	-0.181	-0.198		-0.314
	(0.324)	(0.305)		(0.304)	(0.309)	(0.307)		(0.333)
IPO Activity at Exits	-0.040		-0.552				-0.570	-0.048
	(0.494)		(0.551)				(0.561)	(0.491)
IPO Activity at SBO Exits	-0.125		-0.147				-0.119	-0.154
	(0.297)		(0.243)				(0.242)	(0.288)
Industry Specialization (HHI)	3.078	4.137	3.637	3.270	2.980	2.237	4.001	2.663
	(4.007)	(4.622)	(4.391)	(4.115)	(4.294)	(4.051)	(4.456)	(3.909)
Region Focus: Europe	-2.133*	-1.705	0.029	-1.501	-1.842	-1.666	-0.206	-2.722*
	(1.268)	(1.220)	(1.328)	(1.206)	(1.214)	(1.209)	(1.358)	(1.393)
Region Focus: Asia	-2.708	-6.777***	-7.311**	-7.074****	-6.899****	-7.213****	-8.242**	-2.729
	(2.360)	(2.110)	(3.000)	(1.978)	(1.973)	(1.896)	(3.510)	(2.264)
Region Focus: Australasia	-1.775	3.137	2.496	3.457	3.130	3.624	2.908	-1.499
	(4.099)	(4.353)	(4.259)	(4.347)	(4.275)	(4.248)	(4.370)	(3.774)
Region Focus: Other	-10.893*	-8.170***	-4.110	-7.195***	-8.250***	-6.864**	-4.402	-10.645
	(6.431)	(2.679)	(15.518)	(2.643)	(2.630)	(2.742)	(15.879)	(8.042)
Constant	53.521****	29.483***	51.021****	23.976**	28.810***	25.481**	41.683****	50.451****
	(12.109)	(9.466)	(8.746)	(9.782)	(9.439)	(10.209)	(10.089)	(13.378)
athrho	-0.377	-0.391	-0.653**	-0.347	-0.407	-0.325	-0.674**	-0.348
	(0.266)	(0.465)	(0.289)	(0.332)	(0.429)	(0.289)	(0.297)	(0.234)
lnsigma	2.181****	2.237****	2.410****	2.221****	2.235****	2.214****	2.405****	2.170****
	(0.088)	(0.094)	(0.079)	(0.081)	(0.092)	(0.078)	(0.079)	(0.084)
N	279	316	374	316	316	316	374	279
Inverse of Mills' ratio	-3.186	-3.491	-6.391	-3.072	-3.611	-2.871	-6.513	-2.931
p-value	0.156	0.399	0.024	0.296	0.342	0.262	0.023	0.136

Notes:
*SE in parentheses clustered by GP; * p<0.1; ** p<0.05; *** p<0.01; **** p<0.001*
(1) Average time from first investment made by fund

5. Discussion and conclusions

5.1 Discussion of the results

In this thesis, the effects of secondary buyouts' share of funds' investments and exits on the performance of the fund were studied using an international dataset of buyout fund performance data with vintages from 2003 to 2010 and buyout deal data from the beginning of year 2003 to the end of year 2016. The moderating effects of fund size, average timing of the SBO investments and exits and HY spreads were also studied to further study the motives to engage in SBOs. The research consists of literature review which studied the characteristics of private equity industry and motives for secondary buyouts. Together with the literature on fund performance, the hypotheses were constructed to be tested in the empirical part of the thesis using quantitative methods.

The literature review studied why the engagement in SBOs has been increasing during the past years and what factors motivate GPs to invest in secondary deals or to exit their investments via a secondary buyout. SBOs were found to be mainly rationalized by pressure to invest capital or realize investments and by the opportunities for further value creation exploiting favorable market conditions or complementary skills. Based on the literature, a higher SBO share of investments was assumed to lead to better fund performance whereas a higher SBO share of exits was assumed to lead to worse fund performance. The fund size, timing of SBO investments and exits and debt market conditions were expected to moderate the effects.

In the quantitative analysis, it was shown that higher SBO share of investments lead to better fund performance to support hypothesis 1. Also, the fund size was found to negatively moderate this effect meaning that smaller funds benefit more of higher SBO share of investments, which supports the opposite of hypothesis 3. The additional models using SBO share of investment and exit volumes to test the internal validity of the research. Using SBO volumes, the timing of SBO investments was found to negatively moderate the fund performance implying that high SBO

share made later in the life of the fund leads to worse fund performance providing weak support for hypothesis 5. The SBO share of exits standalone was not found to have any effect on the fund performance but the credit spread was shown to have convex negative moderating effect on fund performance so that higher SBO share of exits made during high and low credit spreads lead to better fund performance providing partial support for hypothesis 8. The descriptive analysis also shows that larger funds are less likely to exit their investments via SBOs in number of exits. The summary of the hypotheses is presented in table 10.

5.1.1 Engagement in secondary buyouts

The evidence on the better performance of funds that have a higher SBO share of their total investments provides support for the first hypothesis. The results are also in line with the previous study of Arcot et al. (2015) in which pressured buyers were found more likely to engage in secondary buyouts and underperform. In existing research on deal-level performance, secondary buyouts are found to yield lower returns compared to primary buyouts especially when made under pressure (Bonini 2015, Degeorge et al. 2016). However, the results of this thesis and the results of Arcot et al. (2015) raise questions about the claimed underperformance of secondary buyouts. Thus, it can be assumed that secondary buyouts are actually superior to the primary deals when the investments are not made under pressure due to their less riskier nature (Bonini 2015) and when buyers can exploit the selling pressure of the selling PE firm (Arcot et al. 2015).

The analysis on the SBO share of total exits to the fund performance provide no support for the second hypothesis. The relation between SBO share of exits and fund net IRR is found to be slightly concave and thus, the right balance between the extremities will yield the best fund performance. To my knowledge, there is not any existing research on the fund-level effects of SBO exit performance but the previous research on deal-level performance shows differing evidence on the returns of SBO exits compared to IPOs and trade sales. However, the results of this research do not provide any evidence to doubt the equal returns of SBO exits.

5.1.2 Size of the fund

In the descriptive analysis, the size of the fund is shown to negatively correlate with the net IRR of the fund but there is no concerted support for the claim in the regression analysis. However, the fund size is reliably shown to moderate the effect of SBO share of investments on the fund performance. Larger funds with high SBO share of investments underperform whereas small funds have higher IRR with high SBO share of investments supports the opposite of hypothesis 3. The moderating effect of fund size has not been studied before in the context of secondary buyouts at fund-level. Larger funds intuitively have better experience and better financial lever to induce growth in portfolio companies. Humphery-Jenner (2012) show that large funds underperform when they invest in small companies while Achleitner et al. (2012) show that largest companies are exited via IPO implying that smaller companies remain on the market for secondary buyouts. Thus, it can be assumed that larger funds target to acquire larger companies via public-to-private or other private-to-private transactions and engage in SBOs only when they are investing under pressure or if there are no primary deals available which consequently leads to worse performance.

The size of the fund does not show to have any moderate the effect of SBO share of exits on fund performance. Again, this is the first fund-level research to study the effect of SBO share of exits and thus, the results cannot be compared to any other research. However, the samples of Figge et al. (2012) and Jenkinson & Sousa (2015) reveal that on average the companies exited via IPO are much larger in revenue than companies exited via TS or SBO. Also, the companies exited via IPOs are sold by slightly larger funds which gives indication that larger funds prefer to exit via IPO rather than SBO but the results of this research do not provide reliable evidence to support this assumption.

5.1.3 Time of transactions

Existing research on secondary buyouts show that SBOs are usually made later in the life of the purchasing funds than PBOs (Jenkinson & Sousa 2015). This indicates that

SBOs are an alternative choice of investment when there are no better deals available. Funds may be under pressure to invest their unused capital if they are about to raise a new fund and want to boost their reputation as investors (Achleitner & Figge 2014, Bonini 2015). Pressured SBOs are found to underperform and funds investing under pressure underperform in general (Arcot et al. 2015, Degeorge et al. 2016). Neither the descriptive analysis nor the results of the main quantitative analysis do not show any evidence on the negative effect of late SBO investments on fund performance. However, the results of the additional model using the deal volumes provide weak evidence on the worse performance of funds that have higher SBO share of investments made later in the life of the fund.

The literature shows that the pressure to realize investments affect GPs similarly as purchasing pressure. Pressured seller are more likely to engage in SBO and achieve lower returns (Wang 2012). Longer holding time also affects negatively the time dependent IRR measure for fund performance which incentivizes GPs to exit their investments as early as possible without compromising value creation. The evidence from existing research also shows that the deals exited before the closing of a new fund outperform (Braun & Schmidt 2014). Typically PE firms aim to close a new fund every five years (Chung et al. 2012, Metrick & Yasuda 2010). However, the results of the analysis do not support the assumptions of worse performance of funds that have a high SBO share exited late in the life of the fund.

5.1.4 Debt market conditions

Favorable debt market conditions when credit spreads are low lead to increased engagement in SBO investments (Bonini 2015). Lower credit spreads lead to higher leverage of buyouts and higher purchasing prices and consequently to lower returns (Axelson et al. 2013, Zhou et al. 2014). However, the results of this research do not provide any supportive evidence for the assumption that a high SBO share of investment made during times of high credit spreads would lead to better fund performance.

The exit choice is shown to be driven by debt market conditions and PE funds are more likely to engage in SBO exits when debt market conditions are favorable for the sellers (Jenkinson & Sousa 2015, Wang 2012). The sellers can be assumed to benefit from the low credit spreads as purchasing PE firms tend to use more leverage and pay higher prices. The analysis shows that the moderating effect of high-yield spread is negative on fund performance. A further examination of the effect reveals that funds with high SBO share of exits benefit from high credit spreads but the relation is convex and funds that have SBO exits made during times of low credit spreads benefit from higher SBO share of exits.

Table 10: Summary of the hypotheses

Hypothesis		*Result*
H1	The more the fund's investments consist of SBO investments the better the fund performance	Support
H2	The more the fund's exits consist of SBO exits the worse the fund performance	Partial support
H3	The larger the fund size the better the fund performance of funds with high share of SBO investments	Opposite
H4	The larger the fund size the worse the fund performance of funds with high share of SBO exits	Rejected
H5	The later the SBO investments are made into the life of the fund the worse the fund performance for funds with high SBO share of investments	Weak support
H6	The later the SBO exits are made into the life of the fund the worse the fund performance for funds with high SBO share of exits	Rejected
H7	The higher the high-yield spread at the time of SBO investments the better the fund performance for funds with high SBO share of investments	Rejected
H8	The lower the high-yield spread at the time of SBO exits the better the fund performance for funds with high SBO share of exits	Partial support

5.1.5 Implications

This is one of the first studies that evaluates how the secondary buyouts affect the fund performance. The results of the study provide managerial implications for both the general partners and the investors. Individual SBO investments and exits may be very successful or waste of money but overall the results of this study imply that the more the investments of the fund consist of secondary buyout the better the performance. However, for large funds the findings are opposite to this. Thus, the findings may be useful for the general partners this result when screening new investment opportunities. Also, the findings provide support for the investment decisions made by limited partners when evaluating the investment strategies of general partners.

It is dangerous to claim that GPs of smaller funds should invest more in SBOs to boost their fund performance but the findings of this study support this view on an overall level. The factors affecting the investment decisions are complex and the previous ownership of the target company must not be solely used as the determining reason. However, as the existing research also reveals, the SBO investments made under pressure deteriorate the fund performance. Thus, the GPs should be cautious when investing under pressure and should not always engage in SBOs as the easiest alternative.

Standing for the secondary buyout exits, the results show no evidence why GPs should either aim for SBO exits or avoid them. The concave relation between the SBO share of exits and fund performance implies that when there is a balance between the exit options and the most suitable exit route is always chosen, the fund performance is improved. The findings revealed that the credit spread levels have a significant effect on the fund performance and thus, GPs should pay attention to the macroeconomic conditions when realizing their investments.

This study also has important theoretical contributions. This is one of the first studies along with the research by Arcot et al. (2015) that studies the effects of secondary buyout investments on the fund-level performance. In addition, to my knowledge,

this is the first research to study the effects of secondary buyout exits on fund performance. Prior research on SBO returns has questioned the rationale of both secondary buyout investments and exits as the primary choice among alternatives (Bonini 2015, Jelic & Wright 2011, Jenkinson & Sousa 2015). Even though the results of this research do not contribute the research on deal-level performance, the fund-level findings question the overall underperformance of secondary buyouts and are more in line with the findings of Arcot et al. (2015) and Degeorge et al. (2016) that find pressured secondary buyouts to perform worse and with the findings of Achleitner et al. (2012) and Achleitner & Figge 2014 that shown the performance of SBO to be generally equal to other investments and exits.

The effect of fund size has also been debated in existing research mainly supporting the positive (Higson & Stucke 2012, Phalippou & Gottschalg 2009) or concave (Kaplan & Schoar 2005, Robinson & Sensoy 2011) relation between fund size and performance. The results of this thesis show low correlation between the factors but provide evidence on the better performance of smaller funds with high SBO share of investments.

5.2 Reliability and validity

5.2.1 Reliability

Reliability in quantitative research is the extent to which the variables are consistent in what is the intended factor to measure (Ihantola & Kihn 2011). Most of the variables used are chosen based on their usage in previous research. In the only previous research on SBO share of investments' effect on fund performance, Arcot et al. (2015) used a composite variable for buy pressure. The time of investment variable and is used to study the moderating effect of time pressure. The control variable of industry specialization is a variable that has not been used in previous research in the same form but it actually gives a more detailed measure than the dummies variables often used for industry focus.

5.2.2 Internal validity

Internal validity is the extent to which the causal conclusions are valid and the variation of the independent variable is consequent of variation of the independent variables and thus, there is no systematic error in the setting of the study (Ihantola & Kihn 2011). In this study, the method is widely used in existing research of fund performance and the variables included are rationalized based on the variables used in the existing research on the same topic which gives reason to assume the internal validity to be high for this study.

According to Ihantola & Kihn (2011), the main concerns about internal validity are related to the selection of the research method, lack of knowledge or logic and data collection. The risks of internal validity in data collection can be divided into instrumentation issues, order bias and researcher bias. The deductive approach of this research means that the hypotheses are based on the existing theory. Linear regression was chosen as the main method of quantitative analysis as it is widely used in prior research of private equity performance. The data is collected from Preqin which is one of the most used databases by the private equity researchers and thus, the data can be expected to be highly reliable. The data collection and analysis were carefully made to avoid bias in data collection and the selection of sample. However, since the data in Preqin is self-reported by the GPs there might be a bias in the reported values of fund performance. Brown et al. (2015) found that some GPs report higher net asset values when they are about to raise a new fund and top-performing funds report returns lower than the actual returns.

This is one of the first studies along with Arcot et al. (2015) to study the effect the SBO share of investments on fund performance and to my knowledge the first to study the effect of SBO share of exits on fund performance. Thus, the existing research does not provide ready models to use for testing the hypotheses used in this thesis. Most of the hypotheses are rejected due to contradictory evidence from the analysis which poses questions about the internal validity of the research. However, considering the methods and data used, and similar support for hypothesis 1 as in existing research, the internal validity can be alleged to be high.

5.2.3 External validity

External validity or generalizability is the extent to which the results of the research can be generalized to be valid for the other samples, time periods and settings (Ihantola & Kihn 2011). The sample has no exclusions of any geographic regions but includes all funds, deals and exits restricted only by vintage year and fund type. Thus, the results can be globally generalized. However, due to the differences in industry dynamics across countries the results may not apply accurately to every country but gives instead the overall picture of the effects of SBOs on fund performance.

In comparison to several previous studies, the time frame used for the fund vintages is rather short. However, the fund vintages from 2003 to 2010 cover an average Juglar business cycle of 7-11 years. The investing activity and performance information are monitored for 14 years until the end of year 2016 which nearly covers two average business cycles. The secondary buyouts are a rather new phenomenon in the private equity industry and thus, more focus should be on the recent data without ignoring the earlier reasons for the increasing trend of SBOs.

It is reasonable to claim that the chosen sample and time periods represent the whole population and are wide enough draw conclusions of the results. The linear regression results provide an overall picture of the trends of the fund performance development and the average effect of the factors. The goal of this thesis is not to provide a model that would estimate an accurate performance for a fund but to examine the overall effects of SBO investments and exits on the fund performance.

The concerns for the external validity of the study are related to the filtering of the sample for the analysis of SBO investments and SBO exits separately. Due to the selected moderating and control variables, the funds with either no SBO investments or no SBO exits are filtered out when studying the effect of SBO share of investments or SBO share of exits, respectively. Thus, the results only apply to funds that have one or more SBO investments or exits and the comparison to the funds with no SBOs is not conducted.

5.3 Limitations

This thesis is focused on the private equity buyout fund performance internationally and focuses especially on studying the effects of secondary buyouts to the fund performance. As discussed in chapter 5.2 this thesis has several limitations that must be considered when interpreting the results and findings of the study.

Firstly, the quantitative part of the research is based solely on the data gathered from a single database. Even though Preqin is widely used by researchers and investors, it has some limitations in the quality of the data. The data available is based on PE firms' voluntary reporting of the performance figures and other details and may affect a biased sample. Also, the data in Preqin is not perfectly exhaustive and only about one third of buyout funds with the selected vintages had performance data available. Consequently, only about one fifth of the deals gathered from Preqin have corresponding fund information.

Secondly, many of the fund measures are constructed relying on the deal and exit data of Preqin. Due to the lacking data, the deal volume variables were used only in the additional models used to test internal validity of the research. For the same reason, many of the control variables were constructed using equally weighted averages instead of volume-weighted which distorts the data due to the high standard deviations in the deal and fund sizes.

Finally, there are endogeneity issues that have had to be considered. In this research timing of investments and exits as well as the credit spreads were used as proxies to control for pressure and debt market conditions, respectively. However, it is difficult to assess the motives of funds when they are making decisions and thus, the causality of the found relations cannot be confirmed. To tackle the endogeneity issues, there are many control variables used which are benchmarked from existing research.

5.4 Suggestions for further research

This research has complemented the existing research on private equity fund performance being one of the first studies to examine the effects of the secondary buyout share of funds' investments and exits. At the same time, it provides new areas to be studied in further research. Previously, Arcot et al. (2015) have studied how the buying pressure moderates the SBO share of investments and Degeorge et al. (2016) have shown that SBO investments made under pressure underperform. In the future research, it would be interesting to further study what factors actually motivate the funds to engage in SBOs and how the effects of motivators differ from each other.

The research on private equity fund-level performance from the investment and exit type point of view is very scarce. Being the first research to study the effect of SBO exits to fund performance, this research offers first findings to be challenged in the future. The effects of the SBO share of exits on fund performance were found to be low and inconsistent and thus, there is definitely a need for more research on the topic. Attractive debt market conditions and time pressure have previously shown to lead in increase of SBO exits (Bonini 2015, Wang 2012). In the future, it would be interesting to study under what conditions do funds choose to exit via SBOs and how fund characteristics affect to the decision.

Due to the validity restrictions of this study, the results should be validated using a larger sample with a wider timeframe and more detailed fund and deal information. The increase in SBO engagement is a rather new phenomenon and this research leaves open the question about the changes in the investment motives and behavior of the GPs. There is a need for both broader research on the topic and for more focused case studies on the investment and exit behavior of funds.

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